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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/756,408	01/08/2001	John R. Horn	M-8743 US	5464

24251 7590 03/11/2004

SKJERVEN MORRILL LLP
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EXAMINER
MOONEYHAM, JANICE A

ART UNIT	PAPER NUMBER
3629	

DATE MAILED: 03/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/756,408	HORN ET AL.	
	Examin r	Art Unit	
	Jan Mooneyham	3629	

-- Th MAILING DATE of this communication appears on th cover she t with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This is in response to the applicant's communication filed on January 8, 2001.

Claims 1-40 are currently pending in this application.

Drawings

2. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

Under "Claim for Priority" on page 1, the applicant has stated that the provisional was filed on May 12, 2000. The correct date is May 15, 2000.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear who or what determines the settlement.

5. Claim 10 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. What is the communication forum or how is it provided?

6. The term "settlement range" in claims 1-40 is a relative term which renders the claim indefinite. The term settlement range is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

7. Claims 21, 27, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The applicant states that the invention is a method, program and system for resolving a dispute between an initiating party and a responding party. However, the applicant only has one party in each of these claims and there is no step or structure for the resolution or settlement. Essential steps and structure have been omitted.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 1, 11-20 and 21-26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The basis of this rejection is set forth in a two-prong test of:

(1) whether the invention is within the technological arts; and

(2) whether the invention produces a useful, concrete, and tangible result.

For a claimed invention to be statutory, the claimed invention must be within the technological arts. Mere ideas in the abstract (i.e., abstract idea, law of nature, natural phenomena) that do not apply, involve, use, or advance the technological arts fail to promote the

"progress of science and the useful arts" (i.e., the physical sciences as opposed to social sciences, for example) and therefore are found to be non-statutory subject matter. For a process claim to pass muster, the recited process must somehow apply, involve, use, or advance the technological arts.

In the present case, claim 1, 11-20 and 21-26 only recite an abstract idea. The recited steps of providing parties with offers, notifying the parties and determining settlement amount does not apply, involve, use, or advance the technological arts since all of the recited steps can be performed in the mind of the user or by use of a pencil and paper. These steps only constitute an idea of how to resolve a dispute. The claims are not tied to the technological arts. The applicant may want to amend the claims to have a computer manipulating the steps.

Additionally, for a claimed invention to be statutory, the claimed invention must produce a useful, concrete, and tangible result. In the present case, the claimed invention produces a settlement (i.e., repeatable) to a dispute (i.e., useful and tangible).

Although the recited process produces a useful, concrete, and tangible result, since the claimed invention, as a whole, is not within the technological arts as explained above, claim 1 is deemed to be directed to non-statutory subject matter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Burchetta et al (6,330, 551) (hereinafter, referred to as Burchetta).

Referring to Claim 1:

Burchetta discloses a method of resolving dispute comprising:

providing for one or more initiating parties to initiate one or more offers comprising one or more first settlement ranges (col. 4, lines 28-32);

notifying one or more responding parties that one or more offers are initiated (Fig. 1, col. 5, lines 38-40, col. 5, lines 14-19);

providing for the responding parties to initiate one or more responses comprising one or more second settlement ranges (col. 4, lines 33-37); and

determining a settlement amount based on the first and second settlement ranges (col. 3, lines 12-23).

Referring to Claim 2:

Burchetta discloses a method of resolving a dispute using an on line system, said method comprising;

an on line system providing for an initiating party to initiate an offer to settle a dispute, said offer comprising a first settlement range (col. 3, lines 46-53).

the on line system notifying a responding party that the offer is initiated (Fig. 1, col. 5, lines 38-40, col. 5, lines 14-19);

the on line system providing for the responding party to initiate a response to settle the dispute, said response comprising a second settlement range (col. 4, lines 33-37); and

the on line system notifying the initiating and responding parties whether a settlement is reached based on the first and second settlement ranges (col. 4, lines 38-41).

Referring to Claims 3, 5, and 16:

Burchetta discloses a method wherein the initiating and responding parties can expand the first settlement range (col. 2, lines 3-7, col. 15, lines 54-62).

Referring to Claims 4 and 6:

Burchetta discloses a method wherein the parties are notified as to whether a settlement is reached or not (col. 5, lines 38-40, col. 8, lines 40-45, col. 9, lines 50-52)

Referring to Claim 7:

Burchetta discloses a method wherein the parties are invited to resubmit new offers (Fig. 2 (23))

Referring to Claim 8:

Burchetta discloses notification of the parties and deadlines for the negotiations (col. 5, lines 38-50).

Referring to Claim 9:

Burchetta discloses a method wherein the services are terminated (Fig. 3 (45,46))

Referring to Claim 10:

Burchetta discloses a method wherein the initiating and responding parties are provided with a communication forum (Fig. 1 (1)).

Referring to Claim 11:

Burchetta discloses a method wherein a settlement is reached (Fig. 3 (44)).

Referring 12:

Burchetta discloses a method wherein a settlement range represents an offer made by a claimant and another settlement range represents an offer made by a respondent, the settlement range offered by the claimant comprising a minimum limit and a maximum limit requested by the claimant and the respondent (col. 1, line 55 thru col. 2, line 2, col. 4, lines 27-37, col. 4, lines 48-50)

.Referring to Claim 13:

Burchetta discloses a method wherein no settlement amount is determined (Fig. 3, (45, 46).

Referring to Claims 14 and 15:

Burchetta discloses a method wherein the settlement amount is a value between or midpoint the settlement ranges offered by the claimant or the respondent (col. 4, lines 54-68).

Referring to Claim 17-20:

Burchetta discloses expanding the settlement range by a percentage of the difference between the upper and lower limits of the settlement ranges and determining a settlement base on the expanded settlement ranges (col. 4, lines 54-65, col. 7, lines 55-67).

Referring to Claims 21-23, 27-29, and 33-35:

Burchetta discloses a method, system and program of resolving a dispute between an initiating party and a responding party comprising:

providing for a party to select a first increment value (col. 7, lines 26-35);

providing for the party to select a first settlement range from a plurality of settlement ranges generated based on the first increment value (col. 7, lines 26-67); and

providing for an party to initiate an offer to settle a dispute (col. 7, lines 26-67).

providing for a party to initiate a response to settle the dispute (col. 7, lines 47-68).

Referring to Claims 24, 25, 30, 31, 36, and 37:

Burchetta discloses a method, system and program wherein the parties select an exact settlement value as the settlement range (col. 3, lines 54-63).

Referring to Claims 26, 32, and 38:

Burchetta discloses a method, system and program wherein the settlement value is determined based on the first and second settlement ranges (col. 3, line 47- col. 4, line 5, col. 4, lines 54-68).

Referring to Claims 39 and 40:

Burchetta discloses a method, system and program wherein the parties are invited to expand the settlement ranges and wherein the method of expanding the settlement range offered by the parties is by a percentage of the differences (col. 2, lines 3-40)

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Management Science discloses a multi-issue negotiation system wherein parties can exchange informal messages

Conflict resolution discloses identifying possible settlements and seeking a settlement range.

Oki Electric discloses an electronic accounts settlement system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jan Mooneyham whose telephone number is (703) 305-8554. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Weiss can be reached on (703) 308-2702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JM

JOHN G. WEISS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600

Notice of References Cited	Application/Control No. 09/756,408	Applicant(s)/Patent Under Reexamination HORN ET AL.	
	Examiner Jan Mooneyham	Art Unit 3629	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,330,551	12-2001	Burchetta et al.	705/80
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	2000148851A	11-1998	Japan	Oki Electric	
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Nolin, Christine, Conflict Resolution: Guiding members toward agreement, Association Management, September 1993, Vol. 45, issue 9, page 32.
	V	Rangaswamy, Arvind and Shell, G. Richard, Management Science, Using computers to realize joint gains in negotiations: Toward an "electronic bargaining table.", August 1997, vol. 43, issue 8.
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

DERWENT-ACC-NO: 2000-477607

DERWENT-WEEK: 200042

TITLE: Electronic accounts settlement system using Internet, includes purchaser's side service system server which stores main electronic accounts settlement processing program to carry out transaction between users

PATENT-ASSIGNEE: OKI ELECTRIC IND CO LTD[OKID]

PRIORITY-DATA: 1998JP-0319690 (November 11, 1998)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 2000148851 A	May 30, 2000	N/A	010	G06F 017/60

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP2000148851A	N/A	1998JP-0319690	November 11, 1998

INT-CL (IPC): G06F009/445, G06F017/60 , G06F019/00 , G07F007/08 ,
G07F019/00

ABSTRACTED-PUB-NO: JP2000148851A

BASIC-ABSTRACT:

NOVELTY - An auxiliary processing program (1130) stored in electronic accounts
settlement system (1120) processes the purchaser's data with limited range. A
purchaser's side service system server (1300) stores main electronic accounts
settlement processing program (1310), performs accounts transaction and
processing between purchaser's side system (1100) and store's side system
(1500).

USE - For performing electronic accounts settlement e.g. electronic commercial
transaction using communication networks like Internet.

ADVANTAGE - Provides high speed accounts settlement by using highly efficient
purchaser's side service system server.

DESCRIPTION OF DRAWING(S) - The figure shows block diagram of accounts
settlement system.

Purchaser's side system 1100

Electronic accounts settlement system 1120

Auxiliary processing program 1130

Purchaser's side service system server 1300

Electronic accounts settlement processing program 1310

Store's side system 1500

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: ELECTRONIC ACCOUNT SETTLE SYSTEM PURCHASE SIDE SERVICE SYSTEM SERVE STORAGE MAIN ELECTRONIC ACCOUNT SETTLE PROCESS PROGRAM CARRY TRANSACTION USER

DERWENT-CLASS: T01 T05 W01

EPI-CODES: T01-H07C5S; T01-J05A1; T05-L01D; T05-L02; W01-C05B3C;

SECONDARY-ACC-NO:
Non-CPI Secondary Accession Numbers: N2000-356012

(19)日本国特許庁（ＪＰ）

(12) **公開特許公報（A）**

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(P2000－148851A)

(43)公開日　平成12年５月30日(2000.5.30)

(51)Int.Cl.'		識別記号	FI			テーマコード'(参考)
G06F	17/60		G06F	15/21	340Z	3E040
	9/445			9/06	420J	3E044
	19/00				420L	5B049
G07F	19/00			15/21	330	5B055
	7/08			15/30	L	5B076

審査請求　未請求　請求項の数１　ＯＬ　（全 10 頁）　最終頁に続く

(21)出願番号　特願平10－319690

(22)出願日　平成10年11月11日(1998.11.11)

(71)出願人　000000295
沖電気工業株式会社
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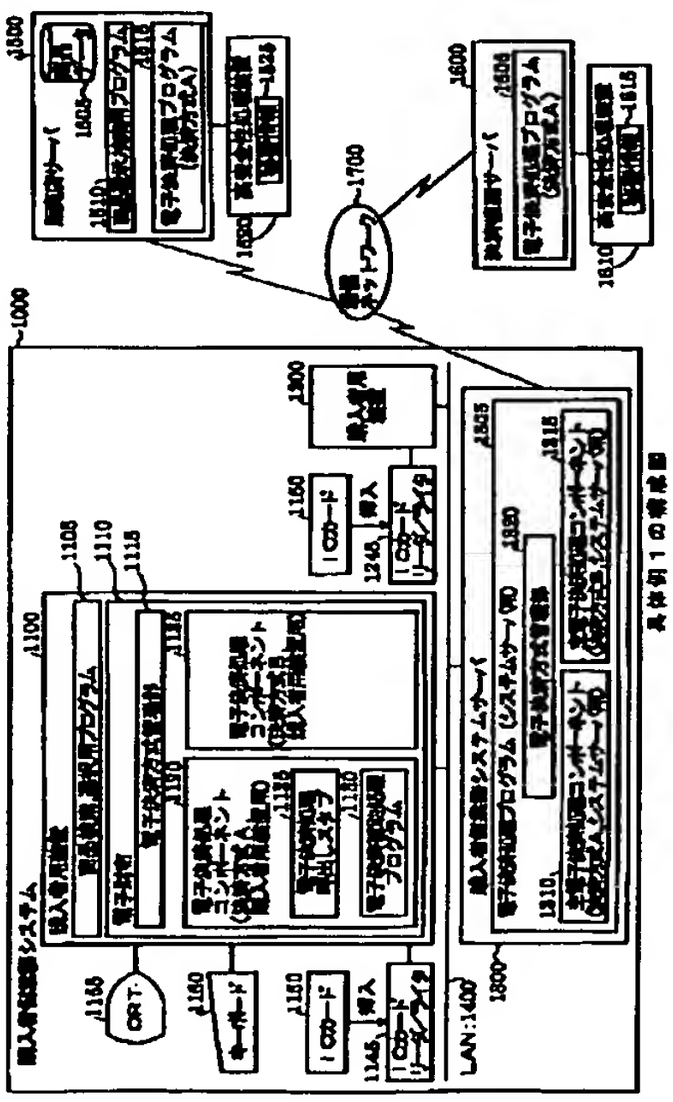
(74)代理人　100082050
弁理士　佐藤　幸男　（外１名）

最終頁に続く

(54)【発明の名称】　電子決済システム

(57)【要約】
【課題】　購入者及び販売店間の商品購入の決済を通信ネットワークを介して行う電子決済システムにおいて、購入者用装置に、多種類の決済方式の電子決済処理プログラムを全て実装させたり、使用する決済方式の電子決済処理プログラム全体をダウンロードさせることなく、必要最小限の処理部分を保持させるか、ダウンロードさせるだけで、多種類の決済方式の電子決済処理を可能とする。
【解決手段】　購入者用装置１１００と販売店用装置１５００間の電子決済処理用プログラム全体のうち、購入者用装置には、そこで行うことが必須の処理範囲にとどめた電子決済補助処理プログラム１１３０をもたせ、残余の処理プログラム（主電子決済処理プログラム１３１０）は、購入者用装置と販売店用装置間で機能する主電子決済処理用装置１３００にもたせ、各々必要時に呼び出し合ってそれらの間の電子決済処理全体を実行させることとする。



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【特許請求の範囲】
【請求項１】　購入者用装置及び販売店用装置間での商品購入の決済を通信ネットワークを介して行う電子決済システムにおいて、
少なくとも前記購入者用装置及び販売店用装置間で機能する主電子決済処理プログラムをもつ主電子決済処理用装置を設け、
前記購入者用装置のもつ電子決済処理用のプログラムを、その購入者用装置上で行う必要のある処理範囲にとどめた電子決済補助処理プログラムとして設定し、実行させるものとし、その購入者用装置及び前記販売店用装置間の電子決済の残余の処理は、前記主電子決済処理用装置のもつ主電子決済処理プログラムで実行させることを特徴とする電子決済システム。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、通信ネットワーク、例えばインターネットを介して商品の購入と決済を行う電子商取引のうち電子決済を行う電子決済システムに関するものである。
【０００２】
【従来の技術】最近、通信ネットワーク、特にインターネットを使用して商品の購入と決済を行う電子商取引（ＥＣ：Electronic Commerce）が注目され、その実用化に向けて多くの実験が行われている。このような電子商取引の一機能である電子決済は、実社会の決済を電子的に行うものであり、その方式には、電子マネー方式、オンライン口座資金移動方式、クレジットカード方式等がある。電子マネー方式には、大別して貨幣価値を内容とする情報（貨幣価値情報）を次から次へと流通させることのできる現金型電子マネーと、利用された金額が電子マネーの発行体へ環流するプリペイド型電子マネーがある。クレジットカード方式には、通信路自体を暗号化するＳＳＬ（Secure Socket Layer）プロトコルやクレジットカード決済用に暗号技術を複雑に組み合わせたＳＥＴ（Secure Electronic Transaction）を用いたものが標準的であるが、それ以外にも通信ネットワーク上の販売店で種々の方式が用いられている。
【０００３】いずれにせよ電子決済では、取引相手が目視により確認できないことや、通信ネットワーク上を個人の秘密情報や貨幣価値情報を伝送させる必要があることから、例えばデジタル署名、暗号化あるいは一方向性ハッシュ等の暗号技術を使用してセキュリティ機能を高める必要がある。
【０００４】上記電子決済方式中、電子マネー方式における貨幣価値情報や、デジタル署名又は暗号処理に使用するユーザ用秘密鍵等の秘密情報は、パーソナルコンピュータ等の通信端末に常時接続された記憶装置、例えばハードディスクに格納しておくと、通信ネットワークを介しての他者侵入による破壊，改ざん，盗用等の虞があり、セキュリティ上の危険が大きいため、ＩＣカード中に格納されることが多い。ＩＣカードは、これら貨幣価値情報や秘密情報を格納するだけでなく、それらの情報を使用して入力データに所定の処理を施し、処理結果を出力することができる。例えば、ＩＣカード内のデジタル署名用のユーザ用秘密鍵を使用し入力データにデジタル署名を行って出力することができる。このことからも、多くの電子決済方式において、将来的にＩＣカードの使用が想定されている。

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【０００５】このようなＩＣカードを用いて電子決済を行うシステムの一般的な処理手順を以下に述べる。まず、商品の購入者は、購入者用装置の商品検索，選択用プログラムを使用して購入商品を検索，選択する。購入商品を選択し終えると電子財布を起動し、電子財布がサポートする決済方式中の任意の１つを選択する。これにより決済処理が開始するが、この際、上記ＩＣカードを購入者用装置のＩＣカードリーダ／ライタに挿入しておく。決済処理は、電子財布がサポートする種々の電子決済処理コンポーネント（部品として扱うことのできるプログラム）のうち購入者が選択したものによって行われる。この処理は、通常、販売店サーバのトランザクション処理として、あるいは販売店サーバに決済機関サーバを含めたトランザクション処理として実行される。
【０００６】なお、トランザクション処理中の通信メッセージには、貨幣価値情報や本人認証データ等の重要情報が含まれる。この重要情報は、他者に悪用されたり偽造されたりしないように保持，処理されなければならず、したがって、購入者側においてはＩＣカード内で、販売店や決済機関側においては耐タンパ（tamper）性等を備えた安全性の高い装置内で、保持，処理される必要がある。
【０００７】
【発明が解決しようとする課題】しかしながら上記従来システムでは、次のような問題があった。
（１）上記各電子決済方式は、各々独立に提唱され実験されてきたもので、各方式間の互換性は全くない。したがって、決済時には購入者，販売店が同じ方式で処理する必要があり、購入者，販売店は同じ方式の処理プログラム，装置をもっていなければならない。すなわち、種々の販売店から商品を購入する場合には、各販売店での電子決済毎に各販売店サーバの決済方式で処理する必要があり、購入者用装置として汎用性のある装置を使用した場合でも、その購入者用装置には各種決済方式に対応した種々の電子決済処理プログラムをもつ必要があった。
【０００８】（２）購入者用装置が終始自身で電子決済処理を行うので、高速な電子決済処理を行うためには全ての購入者用装置に高性能が要求された。
【０００９】（３）販売店サーバの決済方式に対応する決済処理プログラムを購入者用装置がもっていない場合

には、決済時に、その販売店の決済方式の決済処理プログラムを販売店サーバから購入者用装置にダウンロードして使用する方法も考えられる。しかしこの方法を従来システムで採る場合、販売店側の決済処理プログラムの全体を購入者用装置にダウンロードする必要があり、通信負荷を高めることになった。

【００１０】本発明は、上記従来システムの問題を解決するためになされたものである。

【００１１】

【課題を解決するための手段】本発明は、上述課題を解決するため次の構成を採用する。購入者用装置及び販売店用装置間での商品購入の決済を通信ネットワークを介して行う電子決済システムにおいて、少なくとも上記購入者用装置及び販売店用装置間で機能する主電子決済処理プログラムをもつ主電子決済処理用装置を設け、上記購入者用装置のもつ電子決済処理用のプログラムを、その購入者用装置上で行う必要のある処理範囲にとどめた電子決済補助処理プログラムとして設定し、実行させるものとし、その購入者用装置及び上記販売店用装置間の電子決済の残余の処理は、上記主電子決済処理用装置のもつ主電子決済処理プログラムで実行させることを特徴とする電子決済システム。

【００１２】

【発明の実施の形態】以下、本発明の実施の形態につき図面を用いて説明する。

《具体例１》

〈具体例１の構成〉図１は、本発明による電子決済システムの具体例１を示す構成図である。ここでは、購入者側業務システムサーバ（主電子決済処理用装置）１３００、販売店サーバ（販売店用装置）１５００及び決済機関サーバ１６００がインターネット等の通信ネットワーク１７００によって接続されたシステム構成を示している。

【００１３】ここで、上記購入者側業務システムサーバ１３００は、ＬＡＮ１４００によって接続された複数台の、ここでは2台の購入者用装置１１００，１２００とで購入者側業務システム１０００を構成している。

【００１４】購入者用装置１１００には、電子商取引を行うための商品検索，選択用プログラム１１０５及び電子財布１１１０が備えられ、また、ＣＲＴディスプレイ（以下、ＣＲＴと略記する。）１１５５、キーボード１１６０及びＩＣカードリーダ／ライタ１１４５が接続されている。

【００１５】上記電子財布１１１０は、電子マネー方式、オンライン口座資金移動方式、クレジットカード方式等、種々の電子決済方式に対応する電子決済処理コンポーネント（部品として扱うことのできるプログラム）を着脱することができる。図示例では、決済方式Ａ（例えばクレジットカード方式），購入者用装置用の電子決済処理コンポーネント１１２０と、他の決済方式、ここでは決済方式Ｂ（例えば電子マネー方式），購入者用装置用の電子決済処理コンポーネント１１３５が装着されている。これら電子決済処理コンポーネント１１２０，１１３５は、電子決済時に実時間で上記購入者側業務システムサーバ１３００からダウンロードすることもできる。

【００１６】電子決済処理コンポーネント１１２０は、購入者側業務システムサーバ１３００の後述電子決済処理プログラム１３０５を呼び出すための電子決済処理呼出しスタブ１１２５と、購入者側業務システムサーバ１３００側からのコールバックに対応する電子決済補助処理プログラム１１３０で構成されている。この電子決済補助処理プログラム１１３０は、購入者用装置１１００及び販売店サーバ１５００間での電子決済処理を行うに当たり、その購入者用装置１１００上で行う必要のある処理範囲にとどめて設定されている。電子決済処理コンポーネント１１３５も、決済方式を異にする点を除き、このような電子決済処理コンポーネント１１２０と同様に構成されている。電子決済方式管理部１１１５は、これらのコンポーネント１１２０，１１３５の管理を行うものである。

【００１７】上記ＣＲＴ１１５５は電子商取引時に種々の情報を表示するＩ／Ｏデバイス、キーボード１１６０は電子商取引時に種々のデータやコマンドを入力するためのＩ／Ｏデバイスである。ＩＣカードリーダ／ライタ１１４５は詳細を後述するＩＣカード１１５０に対して読書きを行うＩ／Ｏデバイスである。

【００１８】他の購入者用装置、ここでは購入者用装置１２００も、決済方式を異にする場合がある点を除き、上記購入者用装置１１００と同様に構成されている。購入者用装置１２００の接続Ｉ／ＯデバイスとしてはＩＣカードリーダ／ライタ１２４５のみ図示されているが、その決済方式に応じてＣＲＴやキーボードも適宜接続される。

【００１９】購入者側業務システムサーバ１３００は、少なくとも購入者用装置１１００，１２００及び販売店サーバ１５００間の電子決済処理を行うための電子決済処理プログラム１３０５を備える。この場合、電子決済処理プログラム１３０５は、電子決済方式管理部１３２０及び種々の決済方式の主電子決済処理コンポーネント（主電子決済処理プログラム）を備えている。ここでは、決済方式Ａ，Ｂ；購入者側業務システムサーバ用の主電子決済処理コンポーネント１３１０，１３１５のみを図示し、それ以外は図示省略されている。

【００２０】上記主電子決済処理コンポーネント１３１０は、購入者用装置１１００及び販売店サーバ１５００間での全電子決済処理範囲から上記電子決済補助処理プログラム１１３０の処理範囲を除いた範囲（購入者用装置１１００，１２００及び販売店サーバ１５００間の全電子決済処理範囲中の大半）の処理を行うように設定さ

れている。主電子決済処理コンポーネント１３１５も、決済方式を異にする点を除き、この主電子決済処理コンポーネント１３１０と同様に構成されている。

【００２１】また、購入者側業務システムサーバ１３００は、電子決済時、必要に応じ、購入者用装置１１００が電子決済処理コンポーネント１１２０を実時間でダウンロード可能に、電子決済処理コンポーネント１１２０相当の電子決済処理コンポーネント（図示せず）を備えて構成されている。この電子決済処理コンポーネントは電子決済処理プログラム１３０５内に独立して設けても、又は上記主電子決済処理コンポーネント１３１０内に包含して設けてもよい。電子決済処理コンポーネント１１３５についても同様である。

【００２２】販売店サーバ１５００は、商品表示，検索用プログラム１５１０及び商品データ１５０５を備え、商品表示，検索用プログラム１５１０が商品データ１５０５を通信ネットワーク１７００上で公開することによって商品を販売している状態にある。この販売店サーバ１５００は、決済方式Ａを採用しており、決済方式Ａの電子決済処理を行う電子決済処理プログラム（決済方式Ａ，販売店サーバ用電子決済処理プログラム）１５１５を備えている。

【００２３】また、販売店サーバ１５００には、デジタル署名や暗号処理に使用する秘密鍵等の秘密情報につき安全性の高い保持，処理が可能な高安全性処理装置１５２０が接続されている。この高安全性処理装置１５２０は、主として販売店サーバ１５００の秘密情報１５２５等を保持し、秘密情報１５２５を使用するデータ処理が可能である。

【００２４】決済機関サーバ１６００は、例えば銀行、クレジット会社又はその代行機関等に設置される。決済機関サーバ１６００は、ここでは決済方式Ａを採用しており、決済方式Ａの電子決済処理を行う電子決済処理プログラム（決済方式Ａ，決済機関サーバ用電子決済処理プログラム）１６０５を備えている。また、決済機関サーバ１６００にも、販売店サーバ１５００における高安全性処理装置１５２０と同様に高安全性処理装置１６１０が接続されている。この高安全性処理装置１６１０は、主として決済機関サーバ１６００の秘密情報１６１５等を保持し、秘密情報１６１５を使用するデータ処理が可能である。

【００２５】図２は、電子決済時に購入者が使用するＩＣカード１１５０の内部構成図である。このＩＣカード１１５０は、ここでは決済方式Ａと決済方式Ｂに対応して構成されており、内部にはカードＯＳ１８０５、決済方式Ａ，ＩＣカード用電子決済処理コンポーネント１８１５、決済方式Ｂ，ＩＣカード用電子決済処理コンポーネント１８２０及び両コンポーネント１８１５，１８２０の管理を行う電子決済方式管理部１８１０が実装されている。また、各決済方式Ａ，Ｂでの決済に必要なデータ１８２５，１８３５が格納されている。決済方式Ａ用データ１８２５には決済処理時に使用される例えば購入者用秘密鍵等の秘密情報１８３０が含まれている。

【００２６】〈具体例１の動作〉次に、上述具体例１の動作について説明する。まず購入者は、購入者用装置１１００上の商品検索，選択用プログラム１１０５を実行し、WWW（World Wide Web）等を使用して通信ネットワーク１７００に接続されている販売店サーバ１５００上の商品表示，検索用プログラム１５１０にアクセスし、ＣＲＴ１１５５の画面上で商品データ１５０５を参照して購入商品を選択する。そして、その商品についての決済処理を行うために電子財布１１１０を起動する。ＩＣカード１１５０は適時ＩＣカードリーダ／ライタ１１４５に装着する。

【００２７】図３は、決済時におけるシステム（主として購入者用装置１１００及び購入者側業務システムサーバ１３００）の動作を示すフローチャートで、以下、この図３を参照して電子財布１１１０の起動後の動作について説明する。販売店サーバ１５００は、ここでは決済方式Ａを採用している。したがって、電子財布１１１０を起動した購入者は、ＣＲＴ１１５５に表示された電子財布１１１０の決済方式選択画面で決済方式Ａを選択し、決済処理を開始する（ステップ１００）。これにより、電子決済処理コンポーネント１１２０中の電子決済処理呼出しスタブ１１２５が電子決済方式管理部１１１５から呼び出される（ステップ１０５）。

【００２８】呼び出された電子決済処理呼出しスタブ１１２５は購入者側業務システムサーバ１３００上の電子決済処理プログラム１３０５に決済処理要求を行う（ステップ１１０）。要求を受けた電子決済処理プログラム１３０５は、電子決済方式管理部１３２０を使用して主電子決済処理コンポーネント１３１０を呼び出す（ステップ１１５）。

【００２９】主電子決済処理コンポーネント１３１０は、本決済処理の主要部として機能するもので、販売店サーバ１５００上の電子決済処理プログラム１５１５との間で通信を行いつつ決済処理を進める（ステップ１２０）。この決済処理においては、購入者の確認を得るために購入者用装置１１００のＣＲＴ１１５５の画面にダイアログ表示等をして、通信中の販売店サーバ名表示や、決済に必要なアカウント番号又はＩＣカード１１５０中の秘密情報１８３０とは別個の秘密情報の入力をさせたりする。また、ＩＣカード１１５０中の秘密情報１８３０を使用するデータ入出力処理、例えば秘密情報１８３０、具体的には購入者用秘密鍵を使用してＩＣカード１１５０に入力されたデータにデジタル署名を行って出力させる処理等も行われる。

【００３０】これらの処理は購入者用装置１１００で行うものであるため、購入者側業務システムサーバ１３００の主電子決済処理コンポーネント１３１０は、購入者

用装置１１００の電子決済補助処理プログラム１１３０に処理要求を行う（ステップ１３０）。

【００３１】要求を受けた電子決済補助処理プログラム１１３０は、上述したような購入者用装置１１００側における購入者の確認を得るための処理やＩＣカード１１５０との間のデータ入出力処理（電子決済補助処理）を行い（ステップ１３５）、結果を主電子決済処理コンポーネント１３１０に返し（ステップ１４０）、処理をステップ１２０に戻す。

【００３２】以上のステップ１２０～１４０は、決済処理が全て終了するまで繰り返される（ステップ１２５）。決済処理が全て終了すると、電子決済処理呼出しスタブ１１２５に処理を返す（ステップ１４５）。

【００３３】なお、決済方式Ａにおける電子決済処理は、実際には上述決済方式Ａの購入者用装置１１００（購入者側業務システムサーバ１３００）及び販売店サーバ１５００間のみならず、決済方式Ａの販売店サーバ１５００及び決済方式Ａの決済機関サーバ１６００間でも行われる。図１では、決済方式Ａの販売店サーバ１５００との電子決済は決済方式Ａの決済機関サーバ１６００上の電子決済処理プログラム（決済方式Ａ，決済機関サーバ用電子決済処理プログラム）１６０５を使用して行われる場合を例示している。この例では、購入者が商品を選択することにより、決済方式Ａの販売店サーバ１５００上の電子決済処理プログラム（決済方式Ａ，販売店サーバ用電子決済処理プログラム）１５１５が決済方式Ａの決済機関サーバ１６００上の上記電子決済処理プログラム１６０５に支払指示を出し、決済機関サーバ１６００との間の決済処理を行う。

【００３４】〈具体例１の効果〉

（１）購入者用装置１１００に、多種類の決済方式の電子決済処理プログラムを全て実装したり、あるいは決済時に使用する決済方式の電子決済処理プログラム全体をダウンロードする必要なしに、必要最小限の処理部分（電子決済処理コンポーネント）を保持するか、ダウンロードするだけで、多種類の決済方式の電子決済処理を行うことができる。

【００３５】（２）高性能の購入者側業務システムサーバ１３００を使用することにより、そのシステムサーバ１３００に接続されている全ての購入者用装置１１００，１２００から高速な電子決済処理を行うことができる。すなわち、購入者用装置１１００，１２００自体は従来システムに比べて高い性能を要求されずに、各購入者用装置１１００，１２００からの高速電子決済処理が可能となる。

【００３６】（３）販売店サーバ１５００の決済方式に対応する電子決済処理プログラムを購入者用装置１１００，１２００がもっていない場合で、決済時に、その販売店サーバ１５００のサポートする決済方式の電子決済処理プログラムを他のサーバ、ここでは購入者側業務システムサーバ１３００から購入者用装置１１００，１２００にダウンロードして使用する方法も考えられる。この方法を本発明システムで採る場合、該当する電子決済処理プログラム（主電子決済処理コンポーネント１３１０，１３１５）の全体ではなく、その一部（電子決済処理コンポーネント１１２０，１１３５に相当する部分）を購入者用装置１１００，１２００にダウンロードすればよいので、通信負荷を高めることはない。

【００３７】（４）本発明システムの主電子決済処理用装置を、購入者側業務システムサーバ１３００として購入者側業務システム１０００内にＬＡＮ１４００を介して購入者用装置１１００，１２００と接続して設けたので、購入者側業務に密着，連動したシステム運用が可能になるという利点もある。また、上記電子決済処理コンポーネント１１２０，１１３５に相当する部分を購入者用装置１１００，１２００にダウンロードする際の通信負荷は、ＬＡＮ１４００にはかかっても、通信ネットワーク１７００には全くかからないという利点もある。

【００３８】《具体例２》

〈具体例２の構成〉図４は、本発明による電子決済システムの具体例２を示す構成図である。ここでは、複数台の、例えば２台の購入者用装置１１００，１２００、電子決済代行サーバ（主電子決済処理用装置）２３００、販売店サーバ（販売店用装置）１５００及び決済機関サーバ１６００がインターネット等の通信ネットワーク１７００によって接続されたシステム構成を示している。

【００３９】購入者用装置１１００には、電子商取引を行うための商品検索，選択用プログラム１１０５及び電子財布１１１０が備えられ、また、ＣＲＴディスプレイ（以下、ＣＲＴと略記する。）１１５５、キーボード１１６０及びＩＣカードリーダ／ライタ１１４５が接続されている。

【００４０】上記電子財布１１１０は、電子マネー方式、オンライン口座資金移動方式、クレジットカード方式等、種々の電子決済方式に対応する電子決済処理コンポーネント（部品として扱うことのできるプログラム）を着脱することができる。図示例では、決済方式Ａ（例えばクレジットカード方式），購入者用装置用の電子決済処理コンポーネント１１２０と、他の決済方式、ここでは決済方式Ｂ（例えば電子マネー方式），購入者用装置用の電子決済処理コンポーネント１１３５が装着されている。これら電子決済処理コンポーネント１１２０，１１３５は、電子決済時に実時間で電子決済代行サーバ２３００からダウンロードすることも可能である。

【００４１】電子決済処理コンポーネント１１２０は、電子決済代行サーバ２３００の後述電子決済処理プログラム２３０５を呼び出すための電子決済処理呼出しスタブ１１２５と、電子決済代行サーバ２３００側からのコールバックに対応する電子決済補助処理プログラム１１３０で構成されている。この電子決済補助処理プログラ

ム１１３０は、購入者用装置１１００及び販売店サーバ１５００間での電子決済処理を行うに当たり、その購入者用装置１１００上で行う必要のある処理範囲にとどめて設定されている。電子決済処理コンポーネント１１３５も、決済方式を異にする点を除き、このような電子決済処理コンポーネント１１２０と同様に構成されている。電子決済方式管理部１１１５は、これらのコンポーネント１１２０，１１３５の管理を行うものである。

【００４２】上記ＣＲＴ１１５５は電子商取引時に種々の情報を表示するＩ／Ｏデバイス、キーボード１１６０は電子商取引時に種々のデータやコマンドを入力するためのＩ／Ｏデバイスである。ＩＣカードリーダ／ライタ１１４５はＩＣカード１１５０に対して読書きを行うＩ／Ｏデバイスである。

【００４３】他の購入者用装置、ここでは購入者用装置１２００も、決済方式を異にする場合がある点を除き、上記購入者用装置１１００と同様に構成されている。購入者用装置１２００の接続Ｉ／Ｏデバイスは図示されていないが購入者用装置１２００の決済方式に応じたＩ／Ｏデバイスが適宜接続されている。

【００４４】電子決済代行サーバ２３００は、少なくとも購入者用装置１１００，１２００及び販売店サーバ１５００間の電子決済処理を行うための電子決済処理プログラム２３０５を備える。この場合、電子決済処理プログラム２３０５は、電子決済方式管理部２３２０及び種々の決済方式の電子決済処理コンポーネント（主電子決済処理プログラム）を備えている。ここでは、決済方式Ａ，Ｂ；電子決済代行サーバ用の主電子決済処理コンポーネント２３１０，２３１５のみを図示し、それ以外は図示省略されている。

【００４５】上記主電子決済処理コンポーネント２３１０は、購入者用装置１１００及び販売店サーバ１５００間での全電子決済処理範囲から上記電子決済補助処理プログラム１１３０の処理範囲を除いた範囲（購入者用装置１１００，１２００及び販売店サーバ１５００間の全電子決済処理範囲中の大半）の処理を行うように設定されている。主電子決済処理コンポーネント２３１５も、決済方式を異にする点を除き、この電子決済処理コンポーネント２３１０と同様に構成されている。

【００４６】また、電子決済代行サーバ２３００は、電子決済時、必要に応じ、購入者用装置１１００が電子決済処理コンポーネント１１２０を実時間でダウンロード可能に、電子決済処理コンポーネント１１２０相当の電子決済処理コンポーネント（図示せず）を備えて構成されている。この電子決済処理コンポーネントは電子決済処理プログラム２３０５内に独立して設けても、又は上記主電子決済処理コンポーネント２３１０内に包含して設けてもよい。電子決済処理コンポーネント１１３５についても同様である。

【００４７】販売店サーバ１５００、決済機関サーバ１６００及びＩＣカード１１５０は上述具体例１と同様に構成されている。

【００４８】〈具体例２の動作〉次に、上述具体例１の動作について説明する。まず購入者は、購入者用装置１１００上の商品検索，選択用プログラム１１０５を実行し、ＷＷＷ（World Wide Web）等を使用して通信ネットワーク１７００に接続されている販売店サーバ１５００上の商品表示，検索用プログラム１５１０にアクセスし、ＣＲＴ１１５５の画面上で商品データ１５０５を参照して購入商品を選択する。そして、その商品についての決済処理を行うために電子財布１１１０を起動する。ＩＣカード１１５０は適時ＩＣカードリーダ／ライタ１１４５に装着する。

【００４９】図５は、決済時におけるシステム（主として購入者用装置１１００及び電子決済代行サーバ２３００）の動作を示すフローチャートで、以下、この図５を参照して電子財布１１１０の起動後の動作について説明する。販売店サーバ１５００は、ここでは決済方式Ａを採用している。したがって、電子財布１１１０を起動した購入者は、ＣＲＴ１１５５に表示された電子財布１１１０の決済方式選択画面で決済方式Ａを選択し、決済処理を開始する（ステップ２００）。これにより、電子決済処理コンポーネント１１２０中の電子決済処理呼出しスタブ１１２５が電子決済方式管理部１１１５から呼び出される（ステップ２０５）。

【００５０】呼び出された電子決済処理呼出しスタブ１１２５は電子決済代行サーバ２３００上の電子決済処理プログラム２３０５に決済処理要求を行う（ステップ２１０）。要求を受けた電子決済処理プログラム２３０５は、電子決済方式管理部２３２０を使用して主電子決済処理コンポーネント２３１０を呼び出す（ステップ２１５）。

【００５１】主電子決済処理コンポーネント２３１０は、本決済処理の主要部として機能するもので、販売店サーバ１５００上の電子決済処理プログラム１５１５との間で通信を行いつつ決済処理を進める（ステップ２２０）。

【００５２】この決済処理においては、購入者の確認を得るために購入者用装置１１００のＣＲＴ１１５５の画面にダイアログ表示等をして、通信中の販売店サーバ名表示や、決済に必要なアカウント番号又はＩＣカード１１５０中の秘密情報１８３０とは別個の秘密情報の入力をさせたりする。また、ＩＣカード１１５０中の秘密情報１８３０を使用するデータ入出力処理、例えば秘密情報１８３０、具体的には購入者用秘密鍵を使用してＩＣカード１１５０に入力されたデータにデジタル署名を行って出力させる処理等も行われる。

【００５３】これらの処理は購入者用装置１１００で行うものであるため、電子決済代行サーバ２３００の主電子決済処理コンポーネント２３１０は、購入者用装置１

１００の電子決済補助処理プログラム１１３０に処理要求を行う（ステップ２３０）。

【００５４】要求を受けた電子決済補助処理プログラム１１３０は、上述したような購入者用装置１１００側における購入者の確認を得るための処理やＩＣカード１１５０との間のデータ入出力処理（電子決済補助処理）を行い（ステップ２３５）、結果を主電子決済処理コンポーネント２３１０に返し（ステップ２４０）、処理をステップ２２０に戻す。

【００５５】以上のステップ２２０～２４０は、決済処理が全て終了するまで繰り返される。決済処理が全て終了すると、電子決済処理呼出しスタブ１１２５に処理を返す（ステップ２４５）。

【００５６】なお、決済方式Ａにおける電子決済処理は、実際には上述決済方式Ａの購入者用装置１１００（電子決済代行サーバ２３００）及び販売店サーバ１５００間のみならず、決済方式Ａの販売店サーバ１５００及び決済方式Ａの決済機関サーバ１６００間でも行われる。図４では、決済方式Ａの販売店サーバ１５００との電子決済は決済方式Ａの決済機関サーバ１６００上の電子決済処理プログラム（決済方式Ａ，決済機関サーバ用電子決済処理プログラム）１６０５を使用して行われる場合を例示している。この例では、購入者が商品を選択することにより、決済方式Ａの販売店サーバ１５００上の電子決済処理プログラム（決済方式Ａ，販売店サーバ用電子決済処理プログラム）１５１５が決済方式Ａの決済機関サーバ１６００上の上記電子決済処理プログラム１６０５に支払指示を出し、決済機関サーバ１６００との間の決済処理を行う。

【００５７】〈具体例２の効果〉

（１）購入者用装置１１００に、多種類の決済方式の電子決済処理プログラムを全て実装したり、あるいは決済時に使用する決済方式の電子決済処理プログラム全体をダウンロードする必要なしに、必要最小限の処理部分（電子決済処理コンポーネント）を保持するか、ダウンロードするだけで、多種類の決済方式の電子決済処理を行うことができる。

【００５８】（２）高性能の電子決済代行サーバ２３００を設置することにより、その代行サーバ２３００に接続されている全ての購入者用装置１１００，１２００から高速な電子決済処理を行うことができる。すなわち、購入者用装置１１００，１２００自体は従来システムに比べて高い性能を要求されずに、各購入者用装置１１００，１２００からの高速電子決済処理が可能となる。

【００５９】（３）販売店サーバ１５００の決済方式に対応する電子決済処理プログラムを購入者用装置１１００，１２００がもっていない場合で、決済時に、その販売店サーバ１５００のサポートする決済方式の電子決済処理プログラムを他のサーバ、ここでは電子決済代行サーバ２３００から購入者用装置１１００，１２００にダウンロードして使用する方法も考えられる。この方法を本発明システムで採る場合、該当する電子決済処理プログラム（主電子決済処理コンポーネント１３１０，１３１５）の全体ではなく、その一部（電子決済処理コンポーネント１１２０，１１３５に相当する部分）を購入者用装置１１００，１２００にダウンロードすればよいので、通信負荷を高めることはない。

【００６０】（４）本発明システムの主電子決済処理用装置を、電子決済代行サーバ２３００として購入者用装置１１００，１２００とは独立して通信ネットワーク１７００上に設置したので、具体例１の購入者側業務システム１０００等、他のシステムの制約を受けることなく構成し、機能させ得、具体例１に比べてより多機能，高機能な電子決済処理が可能になるという利点もある。

【００６１】なお、上述具体例１，２のいずれも、販売店サーバ１５００の電子決済処理プログラムとしては決済方式Ａのもの（プログラム１５１５）のみ備えた場合について述べたが、これのみに限定されることはない。その他の１又は複数の、例えば、決済方式Ｂの販売店サーバ用電子決済処理プログラムをも備え、購入者用装置１１００，１２００との間で任意に選択されたＡ，Ｂいずれかの決済方式の電子決済処理プログラムを用いて電子決済を行うようにしてもよい。

【図面の簡単な説明】

【図１】本発明システムの具体例１を示す構成図である。

【図２】図１中のＩＣカードの内部構成図である。

【図３】具体例１の動作を示すフローチャートである。

【図４】本発明システムの具体例２を示す構成図である。

【図５】具体例２の動作を示すフローチャートである。

【符号の説明】

１０００　購入者側業務システム

１１００，１２００　購入者用装置

１１０５　商品検索，選択用プログラム

１１１０　電子財布

１１２０　決済方式Ａ，購入者用装置用電子決済処理コンポーネント

１１３０　決済方式Ａの電子決済補助処理プログラム

１１３５　決済方式Ｂ，購入者用装置用電子決済処理コンポーネント

１１５０　ＩＣカード

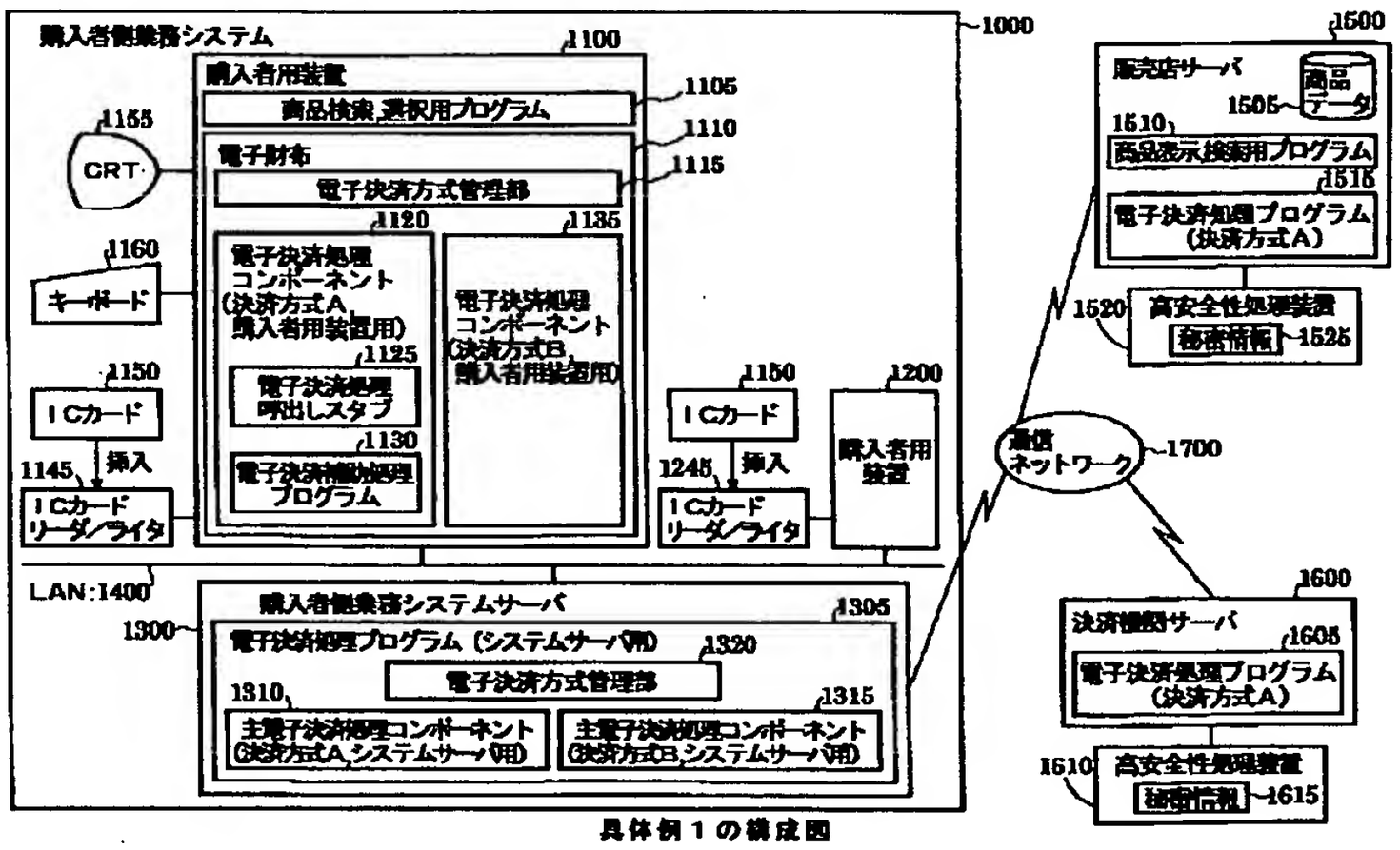
１３００　購入者側業務システムサーバ（主電子決済処理用装置）

１３１０　決済方式Ａ，購入者側業務システムサーバ用主電子決済処理コンポーネント（主電子決済処理プログラム）

１３１５　決済方式Ｂ，購入者側業務システムサーバ用主電子決済処理コンポーネント（主電子決済処理プログラム）

１４００　ＬＡＮ
１５００　販売店サーバ（販売店用装置）
１５０５　商品データ
１５１０　商品表示，検索用プログラム
１５１５　決済方式Ａ，販売店サーバ用電子決済処理プログラム
１６００　決済機関サーバ
１６０５　決済方式Ａ，決済機関サーバ用電子決済処理プログラム
１７００　通信ネットワーク
２３００　電子決済代行サーバ（主電子決済処理用装置）
２３１０　決済方式Ａ，電子決済代行サーバ用主電子決済処理コンポーネント（主電子決済処理プログラム）
２３１５　決済方式Ｂ，電子決済代行サーバ用主電子決済処理コンポーネント（主電子決済処理プログラム）

【図１】



具体例１の構成図

【図２】

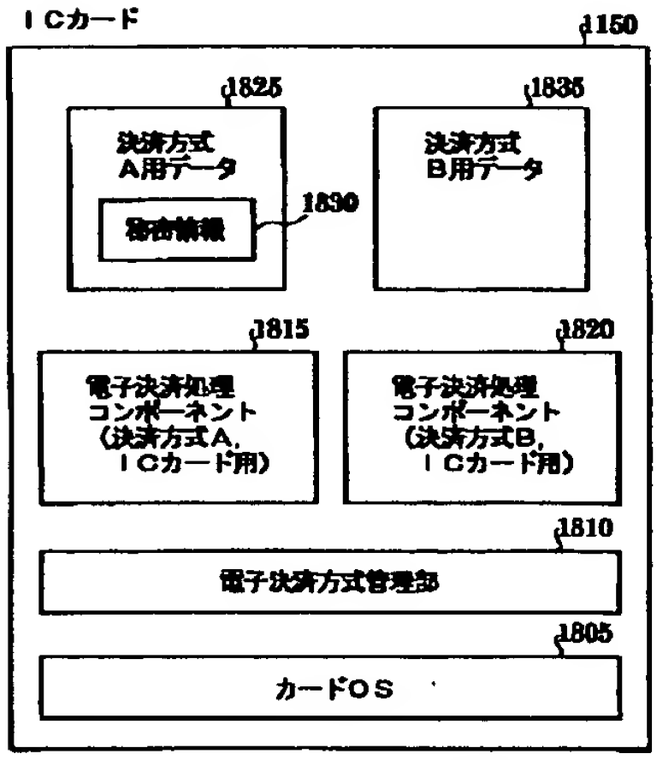
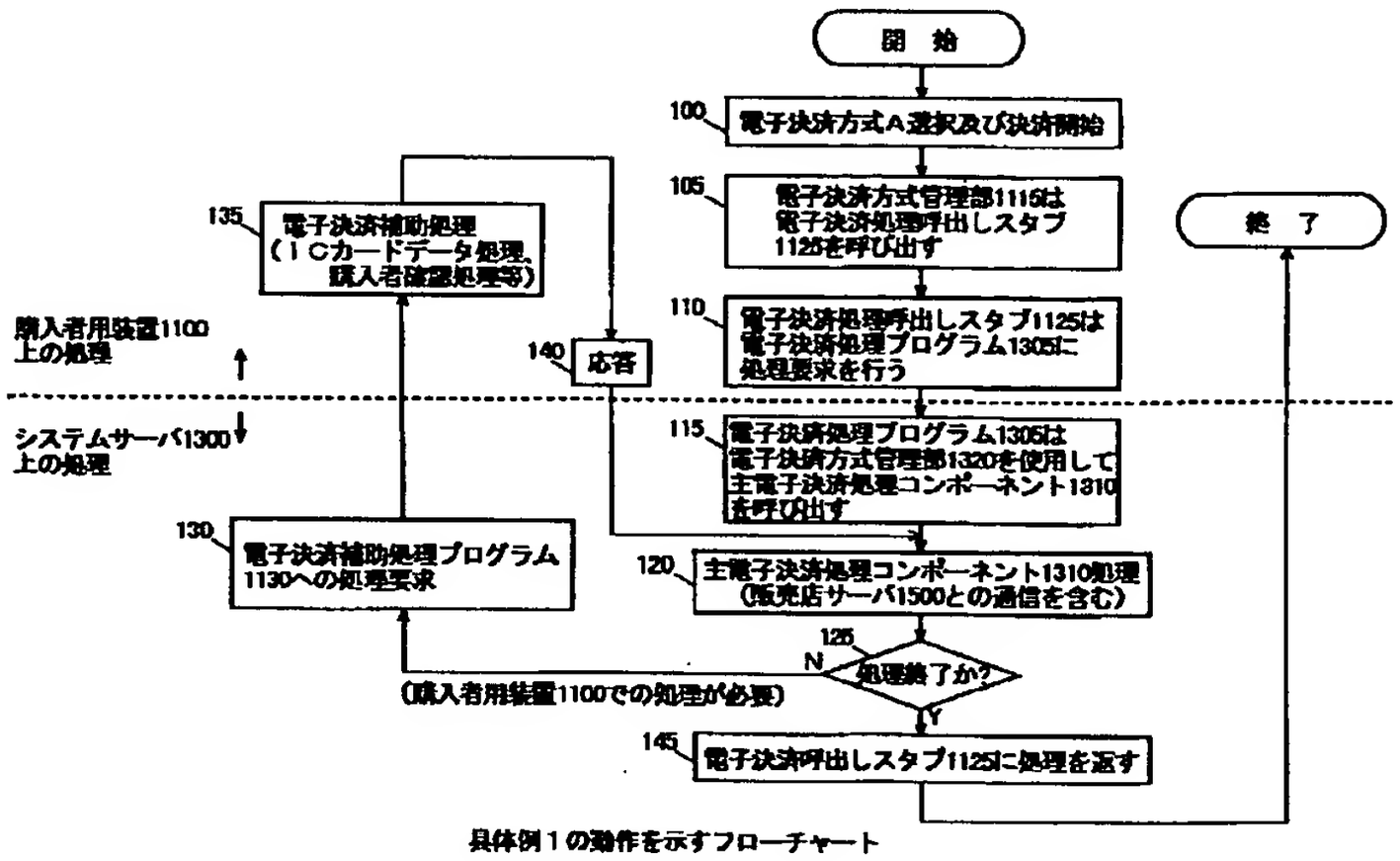


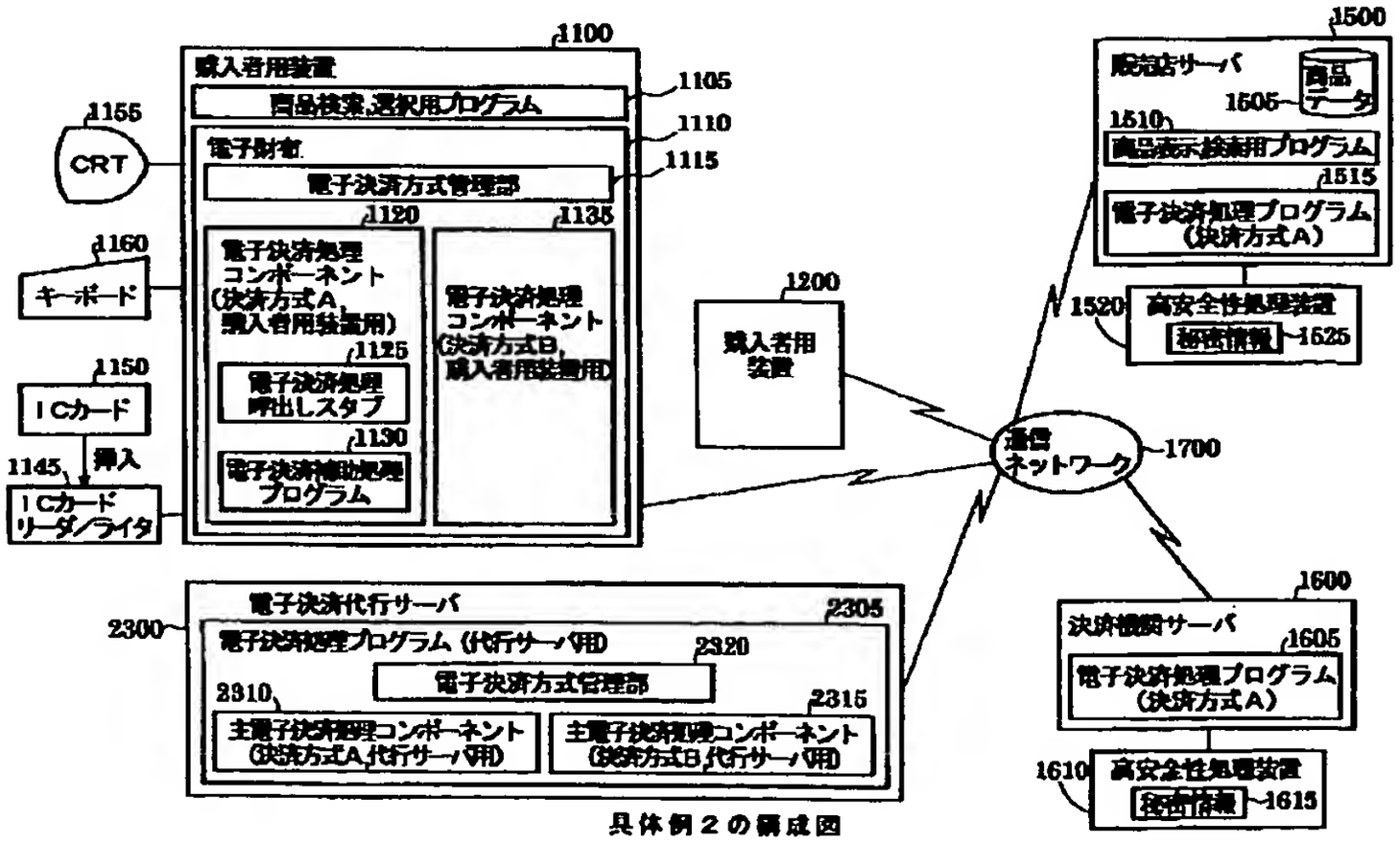
図１中のＩＣカードの内部構成図

【図3】



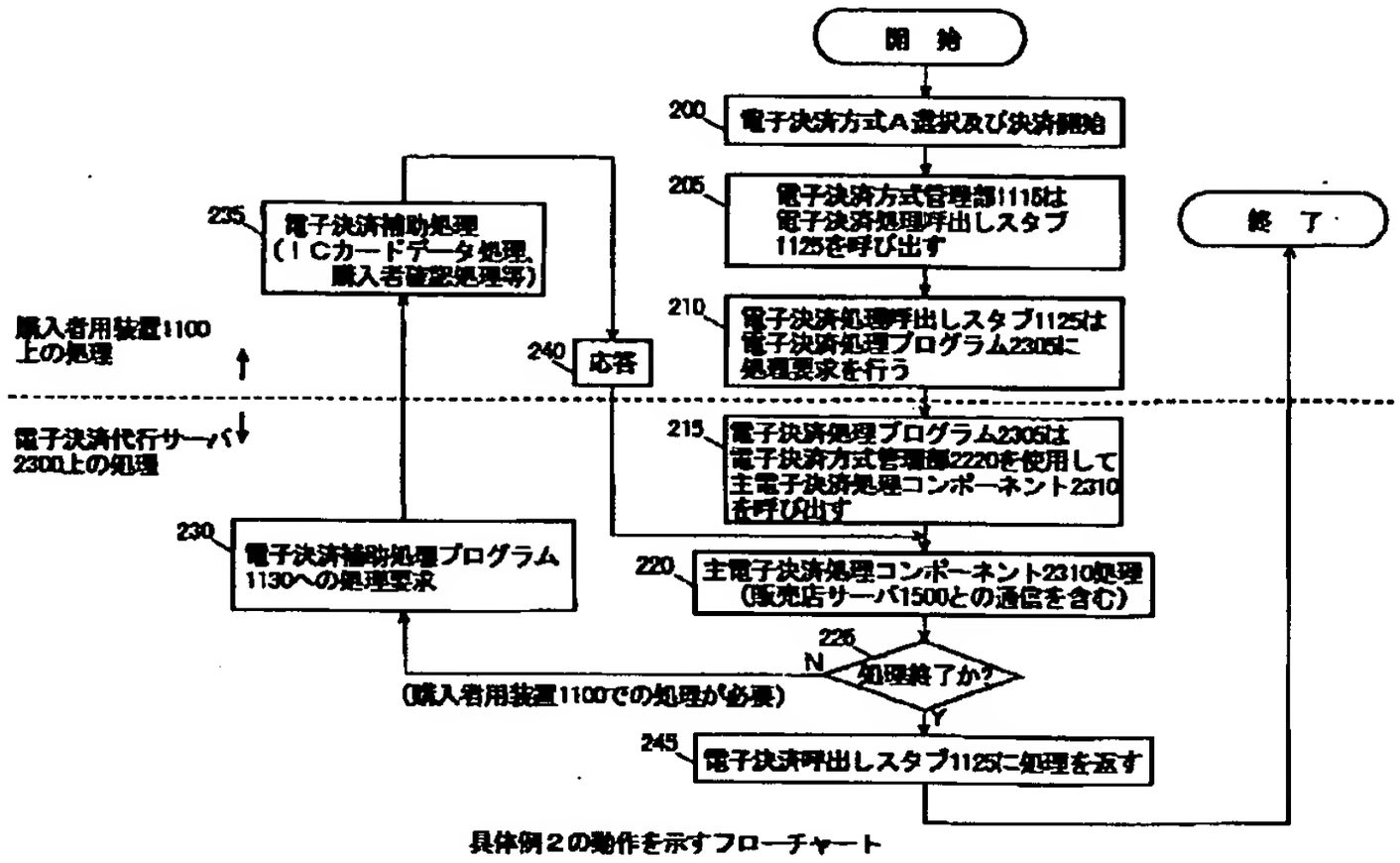
具体例１の動作を示すフローチャート

【図4】



具体例２の構成図

【図5】



具体例２の動作を示すフローチャート

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Conflict resolution: Guiding members toward agreement

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Abstract (Article Summary)

Many associations are suffering from the combination of a weak economic recovery and the consequences of the mergers, corporate takeovers, and deregulation that characterized the 1980s. Troubled times mean that conflict is increasingly common. Conflict can spell disaster for associations and significant distress for top association staff. However, when handled correctly, conflict can allow associations to rejuvenate, cast off entrenched ways of thinking, and emerge healthier and more dedicated to quality service. The different types of conflict include special interests, different values, and personal friction. Association executives can play a role in the resolution of conflict by facilitating negotiations. Ideally, executives help clarify the group's objectives but remain uncommitted to any particular outcome. In addition, the association chief executive or senior staff can help members deal with conflict by: 1. defining the issues, 2. creating an agenda for discussion, 3. gathering information, 4. reading between the lines, 5. brainstorming, and 6. identifying possible settlements.

Full Text (2080 words)

After more than a year of negotiations, my national trade association merged with another representing the same industry. While the new board posed for official photos, dissent was seething beneath members' apparent cordiality. The board was sharply divided about the future of the new association.

The controversy reflected the changing nature of the industry itself. Ten years of deregulation had encouraged the growth of competition. As competition redefined the industry, each company sought to maximize its chances for success in the turbulent new marketplace.

As an association executive director experienced in negotiating and building consensus, I thought I knew how to

handle my association's problems. But today the new association's future remains unclear, and the conflict eventually caused me to leave. This experience led me to further study the dynamics of conflict in associations, where I discovered the importance of dispute-resolution skills for association executives.

Like my group, many associations are suffering from the combination of a weak economic recovery and the consequences of the mergers, corporate takeovers, and deregulation that characterized the 1980s. Nationwide, association revenues have been down for several years. Boards have faced greater than normal turnover. Staff cuts have hampered associations' ability to provide a traditional range of member services. Troubled times mean that conflict, inherent to any confederation of people with differing needs and ideas, is increasingly common.

Conflict can spell disaster for associations and significant distress for top association staff. But when handled correctly, conflict can allow associations to rejuvenate, cast off entrenched ways of thinking, and emerge healthier and more dedicated to quality service.

TYPES OF CONFLICT

SPECIAL INTERESTS. My former association remains deeply divided by the who-gets-what sort of conflict. One group favors more industry deregulation to benefit newcomers, while another group wants to protect the privileges of established companies. Members also disagree on programs. Information services valuable to smaller companies, for example, are scoffed at by members representing large, multinational organizations. From my experience starting up two new associations, I find these interest-based conflicts the most common in associations.

DIFFERENT VALUES. Conflict based on different values commonly reveals itself in disputes about professional standards of conduct or codes of ethics established by associations. For example, the American Medical Association, Chicago, last fall experienced a divisive conflict about code of ethics changes prohibiting doctors from referring patients to laboratories and clinics owned by the referring doctor. The issue eventually went to the membership for a vote.

PERSONAL FRICTION. Interpersonal conflict is often a factor in board disputes. Even if poor communication is not the cause of conflict, it often serves to intensify friction. Here are four sources to beware of:

1. MISPERCEPTIONS OR STEROTYPES PREVENT PEOPLE FROM SEEING ANOTHER' POINT OF VIEW. I dealt with a conflict between representatives of small and large companies in which the small firm rep assumed the large one had access to deep corporate pockets and therefore shouldn't argue about costs.

2. COMMUNICATION CAN BE SUBJECT TO MISINTERPRETATION. When your chief elected officer tells the finance committee leader, "There was an error in the numbers last month," the finance head may hear, "You're not doing your job well."

3. NEGATIVE BEHAVIOR SUCH AS DOMINATING CONVERSATION AND FAILING TO RESPECT RIGHTS OF OTHERS SEES ILL WILL AND INHIBITS COOPERATION. I've often seen board newcomers undermine their own good ideas by being too forceful in trying to sell them.

4. EMOTIONS LIKE ANGER AND RESENTMENT OFTEN PREVENT CLEAR COMMUNICATION. One board member may object to the content of a report, for example, while the report's author feels personally attacked.

WHEN TO SEEK OUTSIDE HELP

In some association disputes, it's wise to call in a professional mediator or respected outside party known to both sides. Consider the involvement of a third party in any of the following situations:

* Staff has taken a side in the dispute or members have become suspicious of staffs neutrality.

* Communication among the members or between members and staff is poor.

* Members have become intensely emotional about the conflict, and either these emotions are preventing a settlement or resulting negative behaviors are creating barriers to useful discussion.

* Misperceptions, stereotypes, or perceived value differences are hindering productive exchanges.

* There are serious disagreements over data, particularly internally generated data.

* There are multiple issues in dispute and members can't agree about the procedure for addressing them.

* The parties have been unable to resolve their dispute using other procedures.

THE CEO'S ROLE IN CONFLICT

The savvy association executive anticipates conflict and arranges to avoid its outbreak. Don't put people together who don't get along. Avoid ruffling feathers with obvious special treatment. On policy issues, be sure all parties receive good briefing materials and have time to digest the information prior to discussion.

Once conflict emerges, however, it can't be suppressed. Members may be reluctant to publicly voice disagreements. While letting them keep silent may seem the easy way out of a difficult situation, inevitably disagreement will boil over. A pattern of conflict can also spell trouble for the group's future. Airing conflict allows an association to consider whether goals, programs, and procedures suit the current membership.

When conflict escalates to the point that members take action--whether publicly, within the board, or in private meetings--conflict has become embedded. As the conflict proliferates, board members may expand the conflict's themes by making generalized and polarizing comments, such as "and another thing I don't like" or "the whole system stinks." Opposing sides may cut off communication while each reaches out to build allies among the membership.

As the association divides itself into opposing camps, the chief executive officer will feel pressured to resolve the conflict. As I have learned from experience, staff should not assume too much personal responsibility in this area. If you try to resolve an embedded conflict behind closed doors, you risk being seen as the source of the trouble.

Remember, too, that it is the association members who are in conflict, not you or the staff. Any viable solution must be member generated, and members must hold an ownership interest in it if it is to work. As chief executive officer, your role is to facilitate negotiations. Never allow yourself to become the spokesperson for one side. Instead, enlist your members to carry the argument. Ideally, you help to clarify the group's objectives but remain uncommitted to any particular outcome.

ROUTES TO A SOLUTION

What else can the association chief executive or senior staff do to help members deal with conflict?

DEFINE THE ISSUE. Make certain the problem is properly and fully defined. I have seen groups argue for hours only to discover that they were talking about two different things. Ask your members to clearly articulate their concerns and make sure each side has really heard the other.

Get the parties to agree on a definition of the problem. Often association controversies have more than one component. A classic example is hammering out an official position on a piece of legislation that may have several components. Make sure all facets of the problem are on the table.

CREATE AN AGENDA FOR DISCUSSION. Reframe the debate as a problem your members share: This is the critical step in beginning the process of resolution. Begin to develop an environment of agreement by seeking out and reinforcing areas where your members agree. The budget as a whole may be controversial, for instance, but it is likely you can find one project or area the members can agree on. Suggest that they segment off easier pieces that can be resolved first to build a history of agreement. Above all, your job is to keep the parties talking. your information, As the controversy develops, learn as much as you can about the problem and the needs of each side. Often there is a lot going on in a conflict that doesn't appear on the surface.

Have a one-to-one conversation with each of the major players, being sure to maintain your own neutrality. You will likely find personal agendas involving a desire for recognition or status. Board conflicts sometimes hide an

individual's goal to be known for resolving a major issue. You may also discover professional or corporate goals that motivate parties. Board members may be bound by their company's position on a legislative matter, for example. While you need to be discreet about confidential matters, you can often find a key to solving the controversy by accommodating hidden goals. Perhaps the desired recognition can come from a different source.

READ BETWEEN THE LINES. Don't overlook underlying motives, for these are often the most powerful factors at work in a conflict. I learned from my association's conflict that you can't expect members to put aside personal or corporate goals for the good of the group.

Be particularly aware of what goes on in association subcultures. Here, personal relationships and trust count heavily. Find out who is calling whom to discuss the problem and what your members really think. Often what people say in the board room differs radically from what they say privately to other board members. Keep tuned in to these differences and tactfully find a way for people to air their private concerns.

Members may have specific instructions from their companies; talk with them about alternative ways to meet those needs. If the issue at hand is controversial, members may also have public relations concerns; help out with strategies for framing their positions publicly.

BRAINSTORM. Often parties get bogged down generating ideas. Staff can help by stimulating discussion. Help members find as many ways as possible to solve the problem. Resist efforts to reject or accept any particular idea at this stage. List several alternative solutions before discussing the merits of any one.

Suggest dividing the problem into smaller pieces that are easier to tackle and that imply possible trade-offs. Encourage members to agree to disagree on values or goals, or help them search for goals or values that all can share. A piece of legislation, for example, may cover eight issues; two affect one part of the membership, two another part, and four affect everyone. The parties can try to compromise so that all of them enjoy some benefit.

Keep your members focused on interests, not positions. Try not to let the positions of each side harden. Hypothetical and open ended questions often help people see things from others' points of view.

IDENTIFY POSSIBLE SETTLEMENTS. Privately assess the options, seeking a settlement range--that is, if the opposing parties represent the extremes, stake out the middle ground. Look for solutions that meet the needs of all sides and be sure of the workability of possible settlements. Provide feedback to members on what you see, but never try to impose a solution. The best tactic is to suggest two or three alternatives that might be workable solutions.

Being aware of some common barriers to settlement can help you guide members toward agreement:

* If you don't clearly define the problem or conflict, finding a solution may be nearly impossible.

* If negotiations fail to address major concerns or the needs of each side, no solution will satisfy all parties.

* If important decision makers are missing from the table, an agreement may not be enforceable.

* If those who are at the table cannot assure the support of member constituencies, an agreement may not be workable.

* If you gather insufficient information, you may miss possible solutions.

* If members evaluate their brainstormed ideas prematurely, they may reject some good ideas.

* If parties don't trust each other, they may never agree on a settlement that is workable. If trust is not possible, you must develop a process for enforcement.

Conflict management skills will be an increasingly important part of the association executive's repertoire. As associations move into the mid-1990s, both increasing work force diversity and decreasing economic resources mean many will face conflict. With conflict come both opportunity and challenge, however. Conflict moves

associations ahead, allowing them to cast off entrenched but unproductive programs or policies and to emerge more dedicated to member needs. Conflict can also create stagnation and major headaches. But learning how to handle conflict will enable association staff and members to end up with a more effective organization.

Christine Nolin, who spent seven years as an association chief staff executive, is a management consultant and mediator with the Mediation Group of Maryland, Silver Spring. She has been appointed to the panel of arbitrators of the American Arbitration Association, New York City.

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MANAGEMENT SCIENCE

Using computers to realize joint gains in negotiations: Toward an "electronic bargaining table"

Arvind Rangaswamy, *G Richard Shell*. **Management Science**. Providence: Aug 1997. Vol. 43, Iss. 8; pg. 1147, 17 pgs

» Jump to full text

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Abstract (Article Summary)

Multiissue negotiations present opportunities for tradeoffs that create gains for one or more parties without causing any party to be worse off. The literature suggests that parties are often unable to identify and capitalize on such trades. A Negotiation Support System called NEGOTIATION ASSISTANT that enables negotiators to analyze their own preferences and provides a structured negotiation process to help parties move toward optimal trades is presented. The underlying model is based on a multiattribute representation of preferences and communications over a computer network where offers and counteroffers are evaluated according to one's own preferences. The parties can send and receive both formal offers and informal messages. If and when agreement is reached, the computer evaluates the agreement and suggests improvements based on the criteria of Pareto-superiority. Parties using the system in structured negotiation settings would achieve better outcomes than parties negotiating face to face or over an e-mail messaging facility, other things being equal.

Full Text (9903 words)

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[Headnot]
Multiissue negotiations present opportunities for tradeoffs that create gains for one or more parties without causing any party to be worse off. The literature suggests that parties are often unable to identify and capitalize on such trades. We present a Negotiation Support System, called NEGOTIATION ASSISTANT, that enables negotiators to analyze their own preferences and provides a structured negotiation process to help parties move toward optimal trades. The underlying model is based on a multiattribute representation of preferences and communications over a computer network where offers and counteroffers are evaluated according to one's own preferences. The parties can send and receive both formal offers and informal messages. If and when agreement is reached, the computer evaluates the agreement and suggests improvements based on the criteria of Pareto-superiority. In this paper, we motivate the system, present its analytical foundations, discuss its design and development, and provide an experimental assessment of its "value-in-use." Our results strongly suggest that parties using the system in structured negotiation settings would achieve better outcomes than parties negotiating face to face or over an e-mail messaging facility, other things being equal. For example, only 4 of the 34 dyads (11.1%) negotiating a simulated sales transaction face to face or over e-mail reached an "integrative" settlement, as compared with 29 of the 68 dyads (42.6%) using NEGOTIATION ASSISTANT. Systems such as NEGOTIATION ASSISTANT have the potential to be used in emerging "electronic markets."
(Negotiation; Decision Support System; Pareto Efficiency; Conjoint Analysis)

1. Introduction

In the past decade, there has been increasing interest in the application of computer technologies to facilitate negotiations.I Using a variety of modeling approaches and spurred by the demands of real-world negotiating environments, the field of Negotiation Support Systems (NSS) is now developing along a number of innovative lines. These range from the design of specialized expert systems that help negotiators prepare for a negotiation, to mediation and interactive negotiation systems that restructure the way negotiations actually take place.

There are at least two reasons for this growing research interest in computer-supported negotiations. First, research consistently suggests that conventional face-to-face negotiations often lead to inefficient outcomes, i.e., settlements that can be improved upon for all parties (e.g., Dwyer and Walker 1981, Gupta 1989, Neale and Bazerman 1991, and Sebenius 1992). NSS offer the promise of improving negotiation outcomes for the negotiating parties by helping them prepare for a negotiation, and/or by providing computer-structured mechanisms to order the negotiation process. Second, business transactions are increasingly being conducted over computer networks, but without dedicated software support. Securities trading is already computerized, and the use of computers to assist other kinds of trades is spreading rapidly (e.g., Konstadt 1991). The growth of networked systems such as the Internet, consumer online services, and Lotus Notes portend greater use of computer-mediated negotiations. NSS can facilitate negotiations in these emerging electronic "bargaining tables" by providing systematic models that structure network negotiations and render them more economically productive.

This paper presents an NSS model to facilitate negotiation over computer networks and describes an experiment to investigate whether the use of the system helps parties locate and execute tradeoffs that maximize the gains from trade in multiissue negotiations. The system, called NEGOTIATION ASSISTANT (hereafter referred to as NA), is based on concepts drawn from the emerging field of negotiation analysis and provides parties with both preparation tools and an "electronic bargaining table" for two-party, multiissue negotiations. The contributions of this research are twofold: From an academic perspective, it provides an analysis of a plausible alternative to a face-to-face negotiation process, a field of increasing interest as evidenced by papers devoted to this topic in the special issue of Management Science (October 1991). From a practical perspective, it points to the emergence of workable mechanisms to enhance outcomes of business transactions over computer networks.

2. Background A Framework for System Development

For computers to add measurable value to the negotiation process, NSS design must be linked to a conceptual framework of negotiation that categorizes various structures under which negotiations take place and stipulates criteria for evaluating outcomes. Walton and McKersie (1965) make the important distinction between "distributive" bargaining in which parties bargain over a fixed pie, and "integrative" bargaining in which parties may "expand the pie" through problem solving, creativity, and identification of differences in priorities and/or compatibility of interests. Research on integrative bargaining suggests that parties negotiating face to face often have difficulty in bargaining in ways that permit them to identify and realize integrative tradeoffs. Thus, many negotiations are characterized by suboptimal tradeoffs, failed communication, and lost opportunities (Pruitt 1981). The fact that parties leave money on the table has led to a search for systematic ways to help parties achieve more integrative settlements, a search that has given rise to the emerging field of "negotiation analysis." Here, we summarize the key precepts of this area. Sebenius (1991) and Young (1991) provide comprehensive reviews.

Unlike purely anecdotal approaches to bargaining (e.g., Cohen 1980), negotiation analysis uses formalisms and analytical approaches that are based on models used in economics, decision analysis, and game theory. However, unlike the pure forms of these theoretical models, negotiation analysis seeks to incorporate realistic assumptions about the way negotiations are actually conducted. For example, neither side is stipulated to act in accord with the precepts of game-theoretic rationality. Rather, both sides are expected to conduct themselves based on their subjective assessments of each other in the light of the usually imperfect information actually available to them. Sebenius (1991) characterizes this approach as "nonequilibrium game theory with bounded rationality and without common knowledge." An important aspect of negotiation analysis has been the application of various tools from decision analysis, including multiattribute utility assessment to help parties prepare for negotiations (Raiffa 1982, pp. 133165). Negotiation analysis seeks ways to "anticipate the likelihood of ex-post Pareto-inefficient agreements, in order to identify ways to help the parties to `expand the pie'"" (Sebenius 1991, p. 21).2 Finally, negotiation analysis eschews the search for unique equilibria and solution concepts such as are found in cooperative game theory, and focuses instead on subjective perceptions of possible zones of agreement, with the objective of identifying agreements that are "among the best" available to the parties. In operational terms, negotiation analysis is used for developing methods to achieve integrative settlements by giving negotiators decision-analytic and other tools to help them articulate their own preferences clearly, and to help one or more parties match up their preferences with those of other parties during the negotiation process.

Existing Negotiation Support Systems. Many existing NSS have explicitly or implicitly relied on some of the concepts of negotiation analysis as a basis for their design. Several of these systems are summarized in Jelassi and Faroughi (1989). NSS may be classified as follows: (1) Preparation and evaluation systems that operate away from the bargaining table to help individuals privately organize information, develop preference representations, refine prenegotiation strategies, or evaluate midnegotiation offers, and (2) Process support systems that operate at or in lieu of a bargaining table. These systems restructure the dynamics and procedures of the negotiation process in order to make salient the possible gains from integrative bargaining (Thiessen and Loucks 1992). Thus, process support systems are designed not only to assist parties in gaining a subjective representation of the negotiation situation, but also to help negotiators to move toward more integrative settlements.

Examples of preparation systems include NEGOPLAN (Kersten et al. 1991), NEGOTEX (Rangaswamy et al. 1989), and GMCR (Fang et al. 1993). In addition to these formal preparation systems, generic decision analysis and spreadsheet software packages are also used in preparing for both negotiation and mediation (Nagel and Mills 1990). Process support systems may be further subdivided into two types: mediation systems and interactive bargaining systems. In mediation systems, a computer model substitutes for or assists a human mediator to prompt the parties toward jointly optimal agreements. Communications among parties using a mediation system are filtered through the computer or a human mediator, although the parties remain in control of the outcome. Interactive bargaining systems simultaneously support the negotiation processes of all the parties, and enable the parties to communicate directly with each other over computer networks. Interactive systems may also contain a function for computer-assisted mediation. Examples of process support systems include PERSUADER (Sycara 1990,1991), and ICANS (Thiessen and Loucks 1992), and the proposed NA system.

We make the following summary observations regarding NSS models and systems reported in the literature. First, among the existing systems, GMCR, ICANS, and NA have more closely relied on the concepts of negotiation analysis. NA is closest to ICANS in this regard. However, NA differs in significant ways in its design and operation compared to its predecessors. First, NA is designed to be more of a facilitator, rather than a mediator. In particular, it is a fully interactive system that allows negotiators to communicate directly with one another over computer networks. Second, NA uses design principles that are somewhat different from the approaches used in Group Decision Support Systems (GDSS). In particular, NA does not require the same high degree of collaboration between parties that is characteristic of GDSS, but may be difficult to establish in real-world negotiation settings. In this sense, NA is differentiated from systems such as PERSUADER, MEDIATOR (Jarke et al. 1987), DECISION CONFERENCING,3 and other GDSS such as those developed by Nunamaker et al. (1991). For a review of the GDSS area, see Rao and Jarvenpaa (1991).

Evaluation of NSS. Few studies have systematically examined the impact of computer-assisted negotiation preparation or computer-mediated communications during negotiation. Although it is generally believed that prior preparation by the parties will enhance negotiation outcomes (e.g., Raiffa 1982, pp. 119-122), there is very little published in the academic literature that has explored the benefits and limitations of computer preparation tools (Lim and Benbasat 1993). The only reported tests we could find were experiments to evaluate ICANS (Thiessen and Loucks 1992) and NEGOTEX (Eliashberg et al. 1993).

There is some published research that has compared computer-mediated communication with face-to-face

communication in group decision tasks. This literature suggests that computer-mediated communication has the following effects: (1) reduces the communication bandwidth, thereby resulting in fewer exchanges of information (Arunachalam and Dilla 1995), although the proportion of task-related information exchanges are somewhat higher (Siegel et al. 1986); (2) increases anonymity, which could lead to less cooperative behavior (Wichman 1970, Arunachalam and Dilla 1995) and more uninhibited behavior (Siegel et al. 1986); and (3) restricts spontaneous expression because of the need (perceived or actual) to take turns communicating.

Experimental evidence suggests that computermediated communication enhances outcomes in some interactive decision tasks, but diminishes outcomes in other tasks. Nunamaker et al. (1991) provide evidence that computer-mediated groups tend to be efficient and effective in generating options for mutual gain. Siegel et al. (1986) show that in the context of risky choice, computer-mediated communication groups shifted further away from members' initial individual choices than groups that followed face-to-face discussions. Hiltz et al. (1986) conclude that the quality of decisions was equally good for these two modes of communication, but there was greater agreement on decisions among the group members in the face-to-face groups. Their experiments also suggest that while computerized conferences were rated as satisfactory, face-to-face meetings were consistently rated as more satisfactory.

A couple of studies have more directly examined the role of the "mode of communication" in influencing outcomes in negotiations. In the context of a single-issue negotiation with asymmetric information, Valley et al. (1995, p. 13) provide evidence that face-to-face negotiations resulted in significantly more mutually beneficial outcomes than negotiations where the parties used written offers and messages that were transmitted by messengers (simulating an e-mail facility). In the context of a multiple-issue negotiation, Arunachalam and Dilla (1995) also report that as compared to the use of an email messaging system, face-to-face negotiation leads to higher individual and group profits. This is the only study that we are aware of that has examined outcomes associated with computer-mediated communication in a context where the proposed NA is likely to be useful.

In summary, past studies have only provided modest and inconsistent insights for assessing the impact that systems such as NA will have on the process and outcomes of negotiations. In this study, we attempt to isolate the effects of computer-assisted preparation and computer-facilitated communication in the context of a multiple-issue, integrative bargaining problem.

3. Negotiation Assistant: Design and Operation

In this section, we first describe the design criteria for the NA system, and relate these criteria to the appropriate concepts described in the previous section. Next, we provide a description of the operation of the system.

Design Criteria

Moving Toward Pareto-Efficiency. The NA system is designed to foster more efficient outcomes by lessening the impact of factors that hinder the realization of integrative outcomes, which are more likely to occur when the parties are able to identify differences regarding their priorities, resources, risk preferences, and utilities (Pruitt 1981). Trading on these differences represents a rich source of value to be mined in a negotiation (Raiffa 1982, p. 131; Lax and Sebenius 1986). However, it is difficult to identify and optimally trade on these differences because (1) parties are not clear about their own priorities, (2) optimal trades are sometimes "lost" in the complex communication pattern that characterizes a negotiation with many issues, (3) most negotiation situations present the potential for strategic behavior and parties sometimes mislead others regarding their preferences and priorities, (4) human emotions often interfere with rational judgment, and (5) a bias toward "fair" solutions sometimes leads negotiators to exhibit what we call "compromise bias," i.e., parties prefer to find some compromise position between the parties' initial demands on each separate issue rather than to explore tradeoffs between issues that might yield them higher individual and joint gains. This is similar to the notion of the fixed-pie bias referred to by Neale and Bazerman (1991, p. 63).

NA's design addresses these barriers to integrative bargaining in the following ways. First, through the use of several utility assessment techniques, the system helps the parties disaggregate their own preferences and priorities in order to better understand them. Preference assessment is based on a combination of simple additive utility functions recommended by Keeney and Raiffa (1991), and conjoint analysis techniques that have found wide application in psychology and marketing research (Green and Srinivasan 1978, Green and Krieger 1993). These procedures enable users to develop a more precise gradation of their preferences by assessing issues both "one at a time" and as "part of a package." At every stage of utility assessment, users are given maximum flexibility to

internalize insights that are gained as a result of reflection on the bargaining set. By disaggregating preferences, we expect that the parties are more likely to identify and trade on differences between their priorities (Keeney and Raiffa 1991). Second, the system uses a depersonalized computer network environment through which parties negotiate, thus separating "people" from the "problem." The system also provides both parties with real-time, subjective evaluations of the value of offers and counteroffers as they are made. These aspects engender a problem-solving orientation that make salient the rational settlement points (Pruitt 1981).

Finally, by providing a postsettlement option, the system helps parties identify Pareto-superior settlements, where at least one party is strictly better off, and neither party is worse off. In this way, NA provides a technique for minimizing value left on the table after the parties have reached a settlement (Raiffa 1985).

Maximize Confidentiality and Minimize Potential for Gaming the System. Another important design objective of NA is to maximally protect the confidentiality of each side's subjective preferences until such time as both sides have agreed to a deal and both sides agree to examine options that may improve the deal they have concluded. At no time are the inputs of one party revealed to the other except as that party may choose voluntarily to share such information with her counterpart, just as she might in a conventional interaction.

Operation

NA utilizes a multistage process that enables negotiators to prepare for, execute, and evaluate negotiated solutions over a computer network. The inputs provided by users in the preparation stages may be edited and revised as often as needed as negotiations progress. The system provides three main functions: preparation for negotiation, structured communication, and postsettlement evaluation. To illustrate the operation of the system and the user interface, we provide a few sample screens from the system in Figure 1.4

Stage I of NA, called "Issues," specifies the domain of the negotiation, including the issues in play and the options that may be considered for each issue (Screen 1, Figure 1). Following Keeney and Raiffa (1991, p. 132), the current version of the system employs the restrictive assumption that "all inventing and creating of issues has occurred," and that the parties are ready to negotiate over the identified issues. While this is a significant limitation to the practical application of our system, it does, however, allow us to more precisely test the potential value of the system to enhance integrative bargaining.

In Stage II, called "Prepare," NA uses an additive "self-explicated" scoring model to elicit information regarding (1) the relative preferences among issues, and (2) the relative preferences among the options for each issue. The users are first requested to distribute 100 points across all the issues; the users then indicate how many of the points available for each issue they would award themselves for obtaining each option within that issue. NA requires that the most preferred option for an issue be assigned all the points associated with that issue and the least preferred option be assigned zero, and other options awarded some number of points between these two extremes (with ties getting equal numbers of points).5

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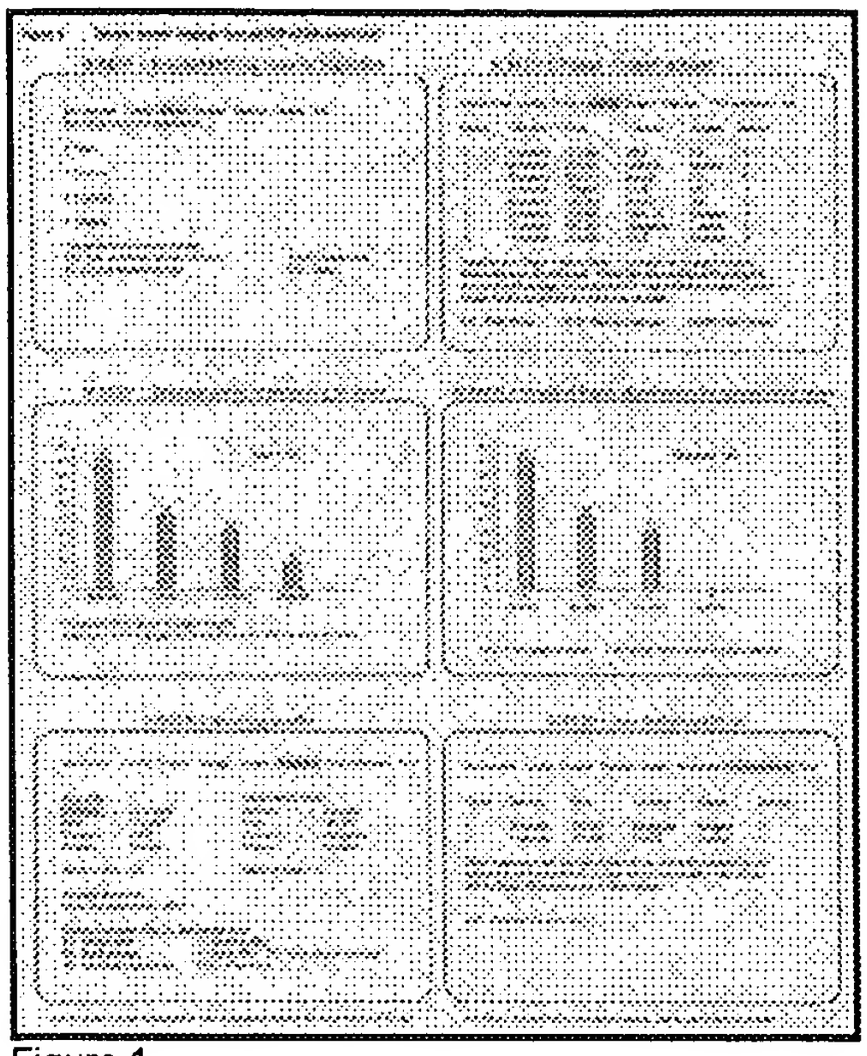

Figure 1.

Using the scores from Stage II, NA constructs in Stage III, called "Ratings," a set of sample settlement packages that includes one option from every issue in play (Screen 2, Figure 1). The ratings task gives the user the opportunity to contemplate options in the context of an overall agreement covering all issues simultaneously. The set of packages is selected automatically using conjoint design to form an orthogonal array. The use of an orthogonal array enables the computation of utilities for each issue and for each option within each issue independently of other issues and options.6 The selected set of packages is arranged in descending order of preference based on the scores provided in Stage II, but the scores themselves are not displayed to give users a fresh look at the consequences of their prioritization in Stage II.7 The user is then asked to rate each package on a scale . from 0 to 100 to indicate the value that package would have if it were to become the final settlement.

Conjoint design is used in selecting all but a maximum of two of the packages to be rated. These two packages frame the conjoint set. The top package is one that yields the highest Stage II score for the user (i.e., it gives the user his or her most preferred options on each of the issues) and is rated at 100 points. The bottom package is one that yields the lowest score (i.e., it gives the user his or her least preferred options on each of the issues) and is rated at 0 points. Between these two extremes are displayed the orthogonal packages, which may be rated at any value the user desires. In essence, in completing the ratings task, the user confronts many of the tradeoffs implicit in the negotiation.

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When the ratings stage is completed, the utility weights, u^subij^, for the ith issue and the jth option of that issue are computed automatically using the following dummy variable regression model (the number of packages presented to the user is chosen to provide sufficient degrees of freedom to estimate the coefficients of the model):

S : A particular settlement presented to the user for her rating;

a: Constant term in the regression model;

R(S): The rating score for S given by the user (on a scale of 0 to 100);

U^subij^: Utility associated with the jth option (j = 1, 2, 3, . . ., J^subi^) of the ith issue;

I: Number of issues;

J^subi^: Number of options of issue i;

X^subij^: Dummy variable with X^subij^ = 1 if the jth option of the ith issue is present in settlement package S, 0 otherwise;

e : Error term, under the usual assumptions of the linear model.

Once u^subij^'s are computed, this information can be accessed graphically from Stage IV, called "Graphs" (Screens 3 and 4, Figure 1). The utility function is presented in the form of bar graphs showing the relative weights of each issue and, within issues, of each option (rounded to the nearest integer). The graphs are also scaled between 0 and 100. In essence, users now observe graphically how their issue-by-issue and option-by-option priorities are affected by the exercise of trading these items off against one another in proposed settlement packages. It is not uncommon for users to feel somewhat dissatisfied with the values reflected in the graphs, and NA permits users to manipulate the graph bars directly using cursor keys to further refine their preferences.

Stage V, called "Negotiate," takes place after the computer has received Stage IV graphic inputs from both parties to the transaction. In essence, the system provides an electronic bargaining table on which negotiations take place. Offers, counteroffers, and written messages can be sent and received over the network. All offers are binding and cannot be retracted, but messages can be exploratory.8 Explicit offers (displayed on the left side of the screen) and counteroffers (displayed on the right side of the screen) are both scored for the user utilizing the party's private preference scores for options generated in Stage IV (Screen 5, Figure 1). Bargaining proceeds in this fashion until either an impasse or an agreement is reached. If no agreement is reached, the parties simply terminate the negotiation, just as they would in a conventional encounter. Mindful of the potential for strategic behavior if an impasse were to trigger release of information in the form of suggestions for continued bargaining, NA does not prompt the parties to continue, nor does it reveal anything about the parties' preferences.

If the parties succeed in reaching an agreement, they enter Stage VI, called "Postsettlement" (Screen 6, Figure 1). This feature follows the suggestion of Raiffa (1985) regarding the possible value of "postsettlement settlements" in which a third party might help negotiators make Pareto-improving moves following an agreement. In Stage VI, NA acts as a computermediator. The system examines the final agreement and compares this package with all other possible packages in the negotiation set. It then generates a list of packages that are, based on the Stage IV inputs of both parties, more advantageous than the current settlement package for one or both sides without making either side worse off.9 (These Pareto-superior packages are calculated in the computer's internal memory, and are not stored anywhere. Once the negotiation ends, this information simply disappears.) If both parties agree, the Pareto-superior packages are revealed to the negotiators in order of their respective desirability to each party. Once again, if both parties agree, they may continue the negotiations in hopes of reaching an agreement on one of the packages suggested by NA. If no such agreement can be reached, the parties revert to their original "Pareto-inferior" deal.

Stage VI can be repeated as often as NA is able to identify at least one package that makes one party better off without making the other party worse off. When a final deal has been struck, either with or without the help of the "Postsettlement" stage, the parties are congratulated on reaching an agreement and they can then exit the system. NA then creates and stores files recording their inputs, negotiation exchanges, and postsettlements.10

4. Experiment and Results

Hypotheses

To test the efficacy of the NA system, we designed a laboratory experiment using a simulated two-party, multiissue sales negotiation. In designing our experiment, we sought to answer two overriding questions: (1) Would parties using NA achieve a higher proportion of efficient agreements as compared to negotiators using conventional face-to-face negotiations, or using an e-mail messaging system? 2) How do the three basic functions of NA, namely, preparation using utility assessment, structured communication, and postsettlement facilitation, contribute to its overall impact on negotiation outcomes? More specifically, we hypothesized that parties using NA would make more integrative trades as compared to parties not using NA, and we hypothesized that each function of NA would add incremental value by building on the part that precedes it. Thus, we propose the following formal hypotheses (see also Lim and Benbasat 1993):

HYPOTHESIS 1. Computer-based utility assessment prior to negotiation leads to more Pareto-efficient outcomes (i.e., subjects using NA for preparation (NAP) will make more integrative trades as compared to subjects who negotiate face to face or over an e-mail system).

HYPOTHESIS 2. The mere use of computers, without support for negotiation preparation and structured communication, will not lead to more efficient outcomes (i.e., subjects using e-mail for negotiation will achieve fewer integrative trades than those using NA).

HYPOTHESIS 3. Structured communication and postsettlement evaluation enhances achievement of Pareto-efficient outcomes (i.e., subjects using NA only for preparation will achieve fewer integrative trades than subjects who use all functions of NA).

HYPOTHESIS 4. The postsettlement option in NA will provide Pareto-improvements to agreements reached using only the preparation and structured communication features of NA.

The Negotiation Scenario

In the scenario presented for the negotiation, the subjects were instructed to act as agents for their respective companies. The information specified that, after a preliminary round of discussions, four issues remained to be resolved between the parties for the transaction to go through: price, delivery date, type of currency to be used, and forum for dispute resolution should contractual disputes arise. A range of options was stipulated for each issue, and the buyers' and sellers' separate instructions revealed the relative importance of each issue and option to them. Table 1 summarizes the induced preference structures for the two roles.11 Due to a shortage of hard currency, the Hungarian buyer for East Europa Medical Group gave the highest priority to the type of currency to be used and preferred Hungarian currency to all other options. In contrast, currency was the U.S. seller's (Healthcare, Inc.) least important issue. The U.S. party valued a delayed delivery date of 14 months over all other items because of a shortage of inventory. The Hungarian buyer, on the other hand, rated delivery as third in importance, just above its fourth-rated dispute resolution issue. Both parties rated price second in priority and both could close a transaction at any of the four price options listed in their instructions. The U.S. seller valued the dispute resolution forum third, just above the least important currency issue. There was thus a clear, mutually advantageous tradeoff to be made between the parties if the buyer obtained Hungarian currency (the buyer's first choice on its highest ranked priority-and the seller's least important issue) in exchange for an agreement to delay delivery to 14 months (the seller's first choice on its highest ranked priority-and the buyer's third ranked issue), assuming some acceptable agreement could be achieved on the issues of price and dispute forum.

Experimental Setup

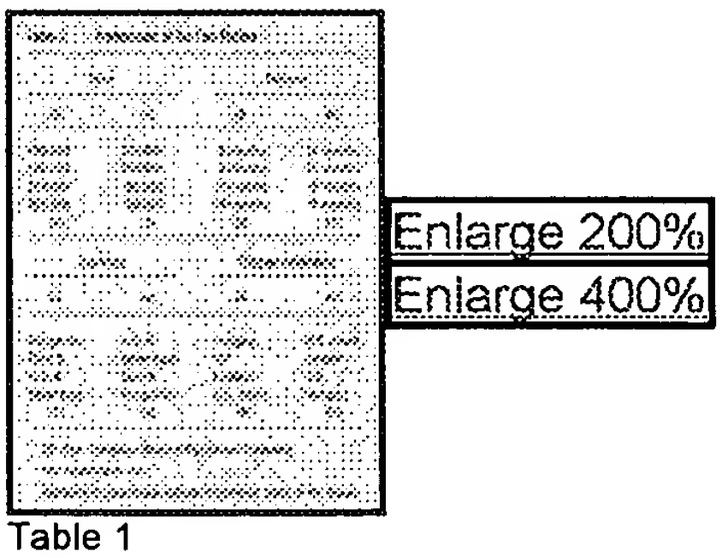

Table 1

First-year MBA students at the Wharton School of the University of Pennsylvania were recruited to participate in this study during their orientation week. Groups of MBA students were randomly assigned to one of four negotiation conditions: (1) face-to-face (FF), (2) e-mail messaging system (EML),12 (3) NA system used for preparation, but followed by a face-to-face negotiation (NAP), and (4) NA system used for both preparation and for structured communication (NAA). Two hundred seventy students participated in our experiment.13 We used a simple one-way research design to obtain an overall assessment of the NA system. While this design reduces the total resources required for testing the hypotheses, we acknowledge its limitations in precisely teasing out the effects of each component of NA. For example, the differences between NAA and NAP include the effects of both computer-mediated communication and computer-supported postsettlement analysis. In each experimental

condition, subjects were randomly assigned to the roles of buyer and seller.

In the face-to-face condition, subjects met in pairs in supervised classrooms, were given the negotiation simulation to study, and were then permitted to freely negotiate with each other for as long as it took them to reach an agreement. The pairs preparing and/or negotiating over the computer network met in supervised computer laboratories, were given both the scenario and the appropriate instructions on the use of NA or the email systems. Those negotiating over the network were not allowed to speak with each other face to face. Those in the NAP condition first prepared for the negotiation without knowing who their partner would be. After their preparation was complete, they were introduced to their partner for the face-to-face encounter. No time restrictions were placed on subjects in any experimental condition with respect to either preparation or negotiation.

To give the subjects a tangible incentive to bargain toward the goals stated in their respective role instructions, subjects were further informed that nondivisible individual prizes worth at least $100 would be awarded to the buyer and seller in each experimental condition who best fulfilled their respective management's priorities.l4 After reviewing and studying the case (and, for those in the NAP and NAA groups, preparing to negotiate using Stages I, II, and III of NA), but before actually negotiating, we asked all subjects to answer several questions, including the time they spent preparing for the negotiation and their "realistic" expectations about what a final agreement would look like. The subjects filled out a second questionnaire when they concluded the negotiation indicating the terms of their final agreement, their perceptions regarding the negotiation process, their affirmation that they bargained in good faith and did not collude to split the prize and, for those in NAP, NAA, or EML conditions, their perceptions regarding the system. The questionnaires used in the study were designed not only to provide us data for testing the formal hypotheses, but to also provide other information to help us characterize the subjects' overall experiences under the different negotiation conditions.15 Results

Prenegotiation Results. As expected, there were few significant initial differences between the groups in the four experimental conditions, except for a slightly higher average age in the FF condition (Table 2). The FF group consisted of entering MBA students in an earlier year. All groups reported occasional participation in actual negotiations over the past year, and two-thirds of the subjects in each condition were male, reflecting the gender composition of MBA programs.

A more important difference between the groups is that subjects using NA spent more than twice the time in preparing for the negotiation than subjects in the FF and EML groups. This difference between the groups is attributable to the fact that groups using NA had to master the operation of the system prior to negotiating. This required them to read through a 12-page manual, and to go through the system's prenegotiation Stages I, II, and III outlined in the previous section. Further, those in the NAP condition also had to print out the graphs of their preferences to take with them to the subsequent face-to-face negotiation. While this difference in preparation time. could arguably explain some of our results, it is important to remember that increased preparation time is a direct consequence of a variable being manipulated in this study, namely, the use of the NA system to prepare for the negotiation.

Prenegotiation Aspirations. Subjects using NA had somewhat more integrative "a priori realistic expectations" regarding their priorities. For example, a higher proportion of subjects expect Hungarian currency and 14 month delivery than subjects in the EML and FF conditions. These differences between the groups are intriguing and, we believe, reflect the subjects' use of NA's preparation stages to better understand and internalize their own preferences. The buyers in the NA groups had a higher expectation of Hungarian currency at settlement (19 out of 62 buyers versus 13 out of 64 buyers in FF and EML conditions combined), and sellers had a higher expectation of 14 months delivery at settlement (30 out of 63 sellers versus 19 out of 62 in the FF and EML conditions combined). These results suggest that people who understand their bargaining positions more clearly may be more likely to form expectations that they can achieve their higher priorities and positions. In the concluding part of this section, we explore the extent to which these aspirations influence the outcomes observed in the negotiations.

Postnegotiation Results. There were several significant differences in outcomes achieved by the four groups. Most importantly, parties using NA for preparation (i.e., those in the NAP condition) executed a higher number of integrative trades than those who did not use NA, providing strong support for H1. For example, Table 3 highlights the most frequent settlements for the issues "Currency" and "Delivery." Recall that our scenario embedded an integrative tradeoff between these two issues that called for the seller to achieve a 14 month delivery term and the buyer to achieve Hungarian currency. Twelve of the 34 pairs in NAP achieved this integrative settlement, suggesting capitulation by both sides on lower rated issues in order to obtain the best options on their highest rated issue. Only 4 of 34 pairs in FF, and 4 of 33 pairs in the EML conditions made this trade. To assess the statistical validity of these differences in outcomes, we conducted a Pearson X^sup2^ test of independence. That is, we

tested the null hypothesis that outcomes reached under FF, EML, and the NAP are independent of the negotiation condition." This is rejected at a significance level less than 0.023 (X^sup2^(3) = 9.58). (For conducting this test, we combined the results of FF and EML conditions because outcomes under these two conditions are not significantly different from each other (X^sup3^(3) = 1.54).)

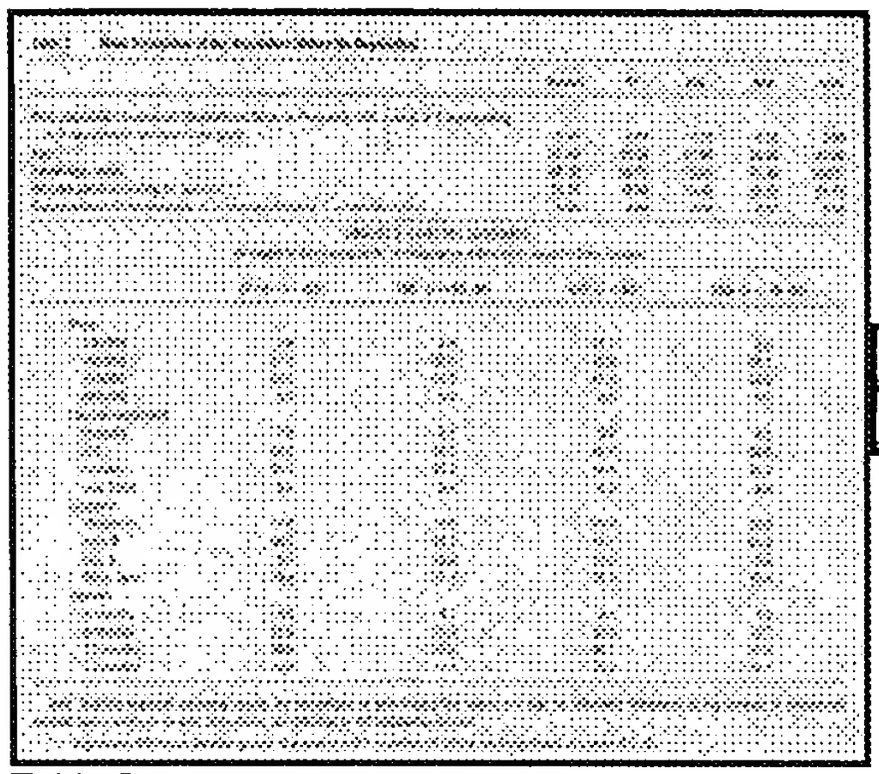

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Table 2

The EML outcomes are inferior to the outcomes from the NAA condition at a significance level less than 0.009 (x^sup2^(3) = 11.57), providing strong support for H2. An interesting outcome in the EML condition is that three pairs did not reach any agreement, when in fact the scenario included only options that provided gains from trade for both parties. This, combined with the inability of two pairs in the NAA condition to reach an agreement, suggests that computer-based communication leads to very poor outcomes for some parties who are not able to effectively handle an impersonal mode of communication, and behave in a more noncooperative manner (Wichman 1970; Arunachalam and Dilla 1995). Thus, the use of systems such as NA may in fact make disagreement outcomes more likely to occur in negotiation contexts with little integrative potential. This raises interesting research issues for further evaluation of NSS.

Although outcomes in the NAA condition (after postsettlement) appear to be more integrative than outcomes in the NAP condition (17 versus 12 out of 34 pairs settling on Hungarian-14 months), the overall differences in outcomes are not statistically significant given our small samples. However, by partitioning the chi-square value to test for independence between components (Agresti 1990, p. 50), there is a marginally significant difference ($p < 0.065$) between NAP and NAA with regard to achieving Hungarian-14 month versus Hungarian-12 month outcomes (X^sup2^(1) = 3.41). It is also important to note that the number of incremental dyads (5) that reached integrative trades in NAA is more than the entire set of dyads that reached integrative agreements in the FF or the EML conditions (4 each).

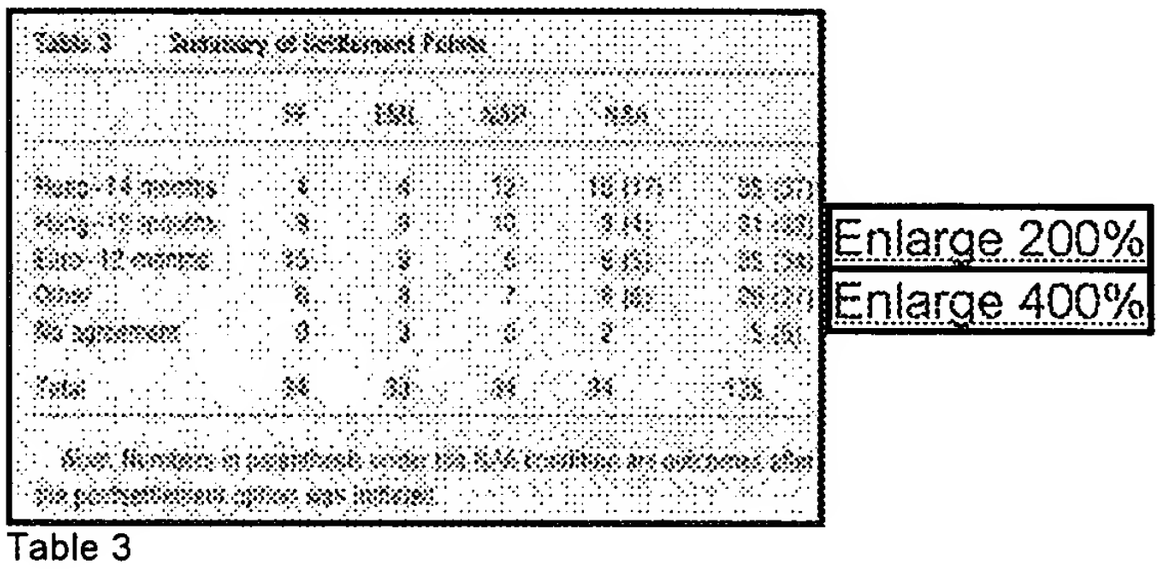

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Table 3

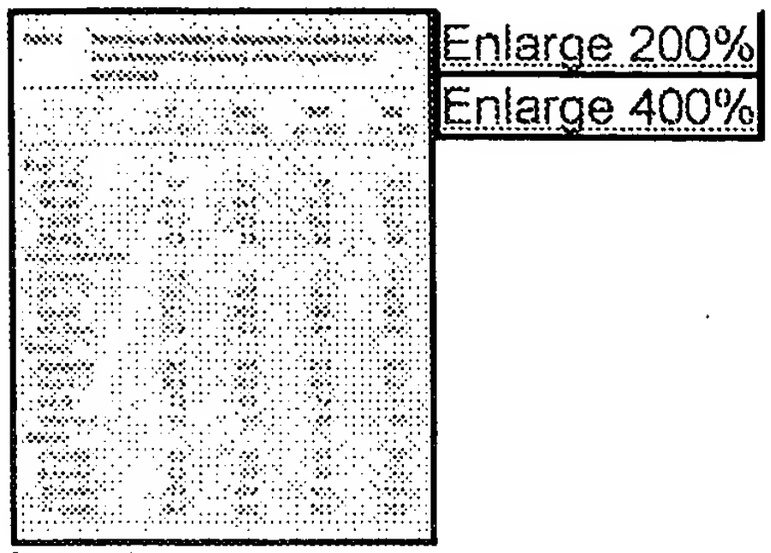

Table 4

To analyze the outcomes between the NAP and NAA conditions more fully, we will examine the preference structure of the two parties summarized in Table 1, and the distribution of outcomes on each option of each issue, as summarized in Table 4. From Table 1, we see that integrative solutions are characterized by East Europa giving up on delivery (third important issue for EE and most important issue for HC) to gain on currency (most important issue for EE, but least important issue for HC). In addition to this "major trade," there is a "minor trade" that enhances the efficiency of outcomes. The parties could trade on Dispute (least important for EE, but third most important for HC), where EE can give up on Dispute options in exchange for concessions from HC on other issues (e.g., price). This suggests that in efficient settlements, we should see Dispute settlements more favorable to HC (more London and U.S. courts). The outcomes in the NAA and NAP conditions seem to support this in a directional sense. Thus NA's structured communication process and postsettlement support provide only secondary benefits compared with the value added by NA's preparation function. However, as the efficiency of relatively minor trades become more important (e.g., when the number of issues increase), these secondary benefits could become very significant. In summary, we found only directional support for H3, a surprise given our expectations for the impact of electronic bargaining tables.

Hypothesis 4 was not supported. Eighteen of the 32 pairs reaching an agreement in the NAA condition settled on a final agreement without utilizing the "postsettlement" feature (i.e., their agreement was already Pareto-efficient given their inputs). The remaining 14 pairs accessed the postsettlement feature and examined packages that were Pareto-superior to their initial settlement, based on their prenegotiation inputs. Of these 14 pairs, only 6 chose to reinitiate the negotiation, and 5 of these pairs reached a settlement different from the one they had initially agreed to. Of these 5 pairs, 3 pairs moved from their initial settlement to a Pareto-superior one that incorporated the tradeoff between Hungarian currency and a 14-month delivery term. Thus, the postsettlement feature did prompt some parties to examine and capture additional joint gains from the negotiation, but more than half of those who accessed the postsettlement feature did not utilize it. Subjects' responses to open-ended questions and debriefings suggest several possible explanations for this result. First, some subjects reported that reopening the negotiation after reaching an agreement revived uncomfortable, distributive aspects of the bargaining that they preferred not to reexperience. Second, some subjects experienced subtle changes in preferences as a result of interactions that took place during the negotiation. Their postsettlement preferences thus diverged both from those stated in the scenario and from their own prenegotiation scoring inputs, rendering the suggested postsettlement options unattractive. Finally, in combination with the factors listed above, subjects simply found the postsettlement feature awkward to use as designed. These results suggest that we should rethink the design of the postsettlement feature for NA.

Aspiration Levels and Postnegotiation Outcomes. To explore how NA influences outcomes, it is instructive to first select for analysis dyads in which either the buyer aspired for Hungarian currency or the seller aspired for 14-month delivery. Of 30 such dyads (out of a total of 67) in the combined FF and EML conditions, only 2 dyads achieved the integrative trade with Hungarian-14 month outcome, while 13 achieved the next best outcome, namely, Hungarian12 months. In contrast, in the NAP condition, there were 19 dyads (out of a total of 34) with at least one party having high aspirations and 9 of them achieved the integrative trade, and a further 5 dyads achieved the Hungarian-12 month outcome. Of further interest is that in the NAA condition, there were 20 dyads (out of a total of 34) with high aspirations, and 14 achieved the integrative trade, while 1 dyad achieved the second best Hungarian-12 month outcome. These results, in conjunction with the overall outcomes summarized in Table 3, suggest that when the parties have high aspirations, integrative trades are more likely to occur, and this likelihood is enhanced greatly by the use of the NA system. Earlier, we noted that the preparation function of NA also helps establish higher aspirations prior to negotiation.

Table 5 summarizes some of the postexperiment perceptions of the negotiators in the four groups. Those using NA

appear to have communicated more honestly and felt that the settlement was more favorable to their interests than those in the other groups.

5. Discussion and Conclusions

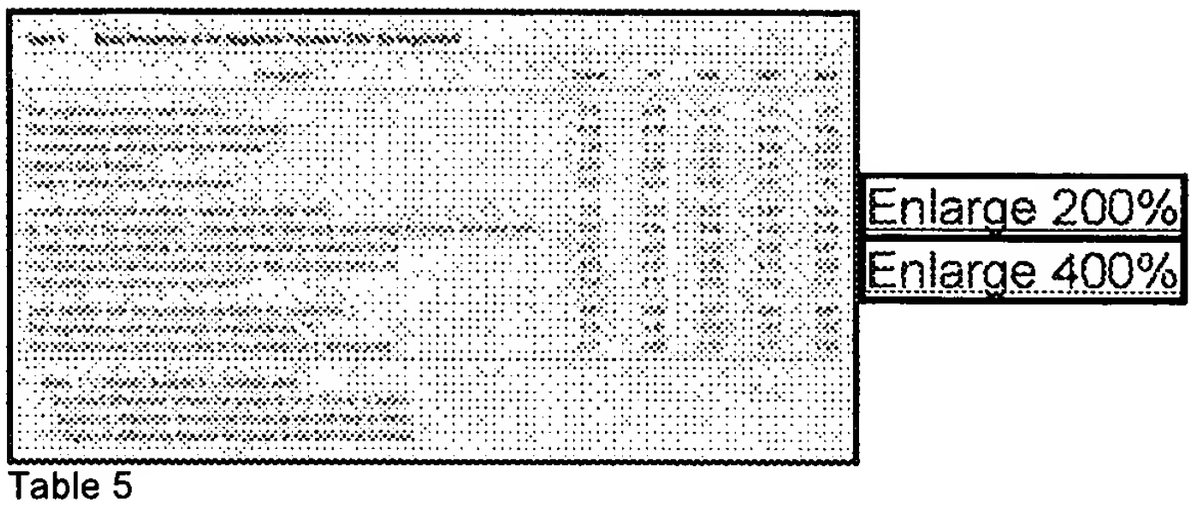

Table 5

The experimental test provides support for the hypothesis that the use of the NA system developed from our research is likely to help negotiators achieve Paretosuperior outcomes in structured multiissue negotiations. The fact that negotiators using NA made more integrative trades than those who negotiated face to face or using an e-mail system suggests that NA system played a key role in helping parties overcome some of the barriers to integrative bargaining that afflict conventional negotiations. The equivalence in outcomes (in terms of integrative trades) between subjects using the e-mail system and those negotiating face to face suggests that the mere use of computer technology will not improve negotiation outcomes. The key to achieving integrative trades is to set and maintain high aspirations in conjunction with a problem-solving orientation (Pruitt and Lewis 1977, p. 181). High expectations provide the motivation to keep looking for integrative trades without settling on compromise solutions, while the problem-solving orientation provides the approach for identifying alternative proposals to offer to the other party that still maintain high potential benefit for self. Thus, the value of NA derives from helping negotiators prepare for the negotiation, and this value is preserved and enhanced if computer communication is structured to make the preparation inputs salient during the negotiation.

Our results demonstrate that NA serves as a useful operational mechanism to implement negotiation analysis to facilitate integrative negotiations. These results, however, do not suggest that NA offers a uniquely superior computer system to prepare or conduct negotiations. Other systems that incorporate utility assessment procedures and/or structure the communications between the parties might also do as well as NA.

Based on our results, we feel comfortable recommending that NA be used for preparation, preferably by all parties to a negotiation. However, we question our initial vision that refined versions of our electronic bargaining table could be deployed across computer networks. First, the subjects in our test began with a fully specified set of issues and options. In fact, in conjoint analysis, a basic assumption is that all options of every issue are in the acceptable range (Srinivasan and Wyner 1989). Most real-world negotiations are not so well structured. To remedy this shortcoming, the system would have to be expanded to include an agendasetting stage prior to the current "issues" stage. This raises additional concerns. An agenda-setting stage could introduce strategic behavior on the part of the negotiators that might subvert the use of our formal model. This requires further investigation.

A second, more general limitation of the tested version of the NA involves its utility assessment procedures, and thus, applies both to the preparation feature and to the electronic bargaining table. The methods of multiattribute utility analysis do not easily model the various interactions among issues that sometimes exist in complex bargaining situations. For example, some interactions significantly alter the value of an issue under special, specified assumptions, thus requiring the system to present models that list the issue as having a very high value under one set of assumptions and a much lower value under others. Such problems are imbedded in the use of multiattribute utility analysis and are subject to solutions as negotiation analysis develops improved models for representing preference interactions.

A third limitation of the system, discussed with respect to H4, involves the postsettlement stage. As now configured, this stage may leave the parties vulnerable to pure distributional bargaining between Paretosuperior packages, especially if there are only a few such packages. This could injure a relationship that, prior to the postsettlement stage, was in good working order. One solution to this problem is to simply ask the parties, prior to the beginning of the negotiation, to agree to an objective criterion for selecting an optimal postsettlement. The negotiators may be asked to choose from a set of criteria such as those suggested by Keeney and Raiffa (1991). The efficacy of

alternative methods of postsettlement support have to be evaluated in future research, especially in view of the possibility of the users gaming the system. An interesting variation on our experiment to test H4 would be to ask subjects who negotiate entirely on a face-to-face basis, to use NA after they reach an agreement to see whether the postsettlement feature improves outcomes.

These limitations of NA are significant. For the moment, however, the value of the system has been demonstrated in our experimental setting, and in our classrooms, where we use it to teach students in a tangible way the structure of integrative tradeoffs and the value of analytical approaches to facilitate negotiations. The system has been used successfully for several years at a few leading MBA programs to demonstrate the principles of utility assessment, integrative tradeoffs, Pareto-optimality, and other concepts of negotiation analysis.

NA also presents new research opportunities. For example, it might be used to help investigate paths toward integrative settlements. Mumpower (1991) has provided some initial insights into preference structures which facilitate "horse-trading." Because the system can keep track of the history of offers, counteroffers, and messages, this allows for investigating patterns that lead to integrative bargaining solutions. Another opportunity for future research is the comparative testing of the NA process against competing processes such as those used in ICANS, or even simple training programs focusing on integrative bargaining, to isolate the relative merits of each of these approaches in situations where all of them can be deployed."

[Footnote]
1 We use the terms negotiation and bargaining interchangeably.

[Footnote]
2 An efficient agreement may be conceptualized in terms of the framework of cooperative game theory, as proposed by Nash (1950). The Nash model reckons payoffs from potential settlements of a negotiation in terms of the utilities of each potential settlement to each party. If mixed strategies (random strategies) are allowed, then the Nash model proposes a normative settlement, called the Nash bargaining solution, that satisfies several appealing criteria including Pareto efficiency. However, the Nash model falls short as a description of real negotiations. In particular, the use of mixed strategies is rarely observed in negotiations, possibly because the performance of a realworld negotiator is evaluated in terms of the utility associated with

[Footnote]
the actual settlement realized, rather than on the strategic desirability of a mixed strategy (Luce and Raiffa 1957). Real-world negotiations are often conducted using pure strategies, i.e., in issue space rather than in utility space. If the negotiation involves only one issue, then the settlement reached using pure strategies will generally be Pareto efficient, but this need not be the case when the negotiation involves multiple issues.

[Footnote]
3 DECISION CONFERENCING is a prototype GDSS that can be applied in a negotiation context (Rao and Jarvenpaa 1991). The negotiating parties first separately develop a decision model with the help of a third party facilitator using decision-analytic techniques. After this, however, the parties communicate directly in identifying a mutually preferred settlement relying on "democratic protocols" and by using various techniques such as decision trees, expected utility maximization, and Pareto algorithms.

[Footnote]
4 Interested readers may obtain a more detailed illustration of the operation of the system by writing to the authors. 5 This assures that the worst outcome in the negotiation (equivalent to the Best Alternative to a Negotiated Agreement (BATNA)) has a value equal to 0, and the best outcome has a value equal to 100. Note also that the "constant sum" scale used here has interval-level properties. 6 An orthogonal array of packages yields several additional benefits. First, orthogonality minimizes the number of packages to be evaluated by users, while still giving a good picture of the user's preferences. For example, if there are four issues each with four options each, there are a total of 256 possible settlement packages. An orthogonal design here could consist of as few as 16 packages. Second, it provides an "additive" utility model enabling the system to derive the imputed value of any package discussed during the negotiation, including, in particular, those not presented in the sample set of packages rated by the users.
The conjoint analysis feature is a significant departure from multiattribute preference elicitation procedures (where used) in previous NSS systems. ICANS and MEDIATOR use formal mechanisms for preference elicitation. However, the packages presented by these systems are not orthogonal, and hence, the resulting utility measurements do not necessarily provide a reliable additive model of preferences. If the set of packages departs considerably from orthogonality, the parameters of the estimated additive utility functions can be unstable, and not valuable for the purposes of identifying efficient settlements. 7 The Prepare stage is technically referred to as the self-explicated, or the "compositional" method of preference elicitation (Srinivasan and Wyner 1989, Green and Krieger 1993). In contrast, conjoint analysis is a "decompositional technique" in which overall preference scores are decomposed into the utility values attached to each issue and options within issues. In early trials of the system, we only had the "Ratings" stage where the profiles were presented in random order. However, the respondents found this task to be very difficult because of their inability to find ap

propriate anchors to facilitate the rating process. It is in view of this that we added the "Prepare" stage as a way to facilitate the Ratings stage.

[Footnote]
8 In electronic markets, intermediaries are emerging to ensure the security and integrity of the system, and enforce all the rules agreed to by parties.

[Footnote]
9 The Pareto-superior packages displayed to the users are automatically scored according to their own preference functions. However, the revelation of these packages only provides ordinal information about the other party's preferences, i.e., it reveals whether a settlement is equal to or superior to the agreed settlement without disclosing the degree of superiority. An alternative display format would indicate only that Pareto-superior packages exist without disclosing the packages themselves. This is the approach adopted in the design of the ONDINE II system (Nyhart and Samarasan 1989). Additional criteria such as "equitability" of each superior package may be used to trim the number of packages displayed.
10 This information is only stored in the local computer of the user. The users may choose not to record any of the exchanges, by selecting the appropriate option in the "Config" menu option.

[Footnote]
11 Only ordinal preferences were induced. The subjects internalized these preferences in their own idiosyncratic manner. This approach

[Footnote]
enabled us to minimize preference variability between subjects, while at the same time allowing subjects in the computer condition to use the preference assessment procedures to better understand their preferences. In real negotiations, subjects are not as clear about the priorities, and may benefit more by using the NA system to understand their preferences. Thus, the experimental procedure is likely to understate any realized benefits of the system.

[Footnote]
12 A Windows-based e-mail system was designed specifically for our experiment. In addition to allowing parties to send messages of unlimited size to each other, the system allowed the parties to conveniently review past messages sent and received. Because e-mail systems have become commonplace, we are not describing our system in any detail here in order to conserve space.
13 The experimental procedures involving the three computer conditions took place in August 1995, except for four dyads that were completed in September 1994. Subjects in the three computer conditions were randomly assigned to the treatments. The face-to-face negotiations took place in September 1993. At that time, the subjects were randomly assigned to either the FF condition or to the NAP condition. The results of that NAP condition are similar to those reported here, and were included in earlier versions of this paper. To conserve space, they are not reported here. Because the groups in the face-to-face condition negotiated at a different time than the groups in the computer conditions (but at the same school, and under similar conditions), there is a possibility that the experimental results are a function of the pretest differences in the subjects. However, the demographic profiles of our subjects were similar across all times and conditions (see Table 1). Further, the agreements reached in the face-to-face condition are consistent with literally hundreds of classroom simulations over four years using this same scenario for instructional purposes.

[Footnote]
14 To minimize chances of collusion in the face of this monetary incentive, we emphasized that the subjects would be required to sign a statement after completing the negotiation that they did not collude to obtain any part of the prize. In the context of the Wharton School's Code of Academic Integrity, we expect this signature to be a significant deterrent to bad faith conduct. In addition, as noted above, all negotiations took place in facilities where subjects were under observation throughout.

[Footnote]
15 A copy of the experimental materials may be obtained by writing to the authors. In the interest of space, we do not report the analyses we have done on the postnegotiation questionnaires.

[Footnote]
16 Note that not all respondents provided answers to this question. This accounts for the variations in sample size used for these statistics. 17 In conducting the following x2 tests, we collapse the no agreement outcomes under the "other" category, except when directly comparing outcomes of EML and NAA. This does not materially affect the results reported.

[Footnote]

18 This research was funded in part by the Reginald H. Jones Center for Management Policy, Strategy, and Organization at the Wharton School, the SEI Center for Advanced Studies in Management at the Wharton School, the University of Pennsylvania Research Foundation, Center for Dispute Resolution, ©Northwestern University, and The Institute for the Study of Business Markets, Penn State University. The authors thank Professor Paul Green for making available computer software used in early versions of the system reported in this paper, Animesh Karna for providing programming support,

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[Reference]
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DERWENT-ACC-NO: 2000-477607

DERWENT-WEEK: 200042

TITLE: Electronic accounts settlement system using Internet,
includes purchaser's side service system server which
stores main electronic accounts settlement processing
program to carry out transaction between users

PATENT-ASSIGNEE: OKI ELECTRIC IND CO LTD[OKID]

PRIORITY-DATA: 1998JP-0319690 (November 11, 1998)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 2000148851 A	May 30, 2000	N/A	010	G06F 017/60

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP2000148851A	N/A	1998JP-0319690	November 11, 1998

INT-CL (IPC): G06F009/445, G06F017/60 , G06F019/00 , G07F007/08 ,
G07F019/00

ABSTRACTED-PUB-NO: JP2000148851A

BASIC-ABSTRACT:

NOVELTY - An auxiliary processing program (1130) stored in electronic accounts
settlement system (1120) processes the purchaser's data with limited range. A
purchaser's side service system server (1300) stores main electronic accounts
settlement processing program (1310), performs accounts transaction and
processing between purchaser's side system (1100) and store's side system
(1500).

USE - For performing electronic accounts settlement e.g. electronic commercial
transaction using communication networks like Internet.

ADVANTAGE - Provides high speed accounts settlement by using highly efficient
purchaser's side service system server.

DESCRIPTION OF DRAWING(S) - The figure shows block diagram of accounts
settlement system.

Purchaser's side system 1100

Electronic accounts settlement system 1120

Auxiliary processing program 1130

Purchaser's side service system server 1300

Electronic accounts settlement processing program 1310

Store's side system 1500

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: ELECTRONIC ACCOUNT SETTLE SYSTEM PURCHASE SIDE SERVICE SYSTEM
SERVE STORAGE MAIN ELECTRONIC ACCOUNT SETTLE PROCESS PROGRAM CARRY
TRANSACTION USER

DERWENT-CLASS: T01 T05 W01

EPI-CODES: T01-H07C5S; T01-J05A1; T05-L01D; T05-L02; W01-C05B3C;

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	19/00				４２０Ｌ	５Ｂ０４９
Ｇ０７Ｆ	19/00			15/21	３３０	５Ｂ０５５
	7/08			15/30	Ｌ	５Ｂ０７６

審査請求　未請求　請求項の数１　ＯＬ　（全 10 頁）　最終頁に続く

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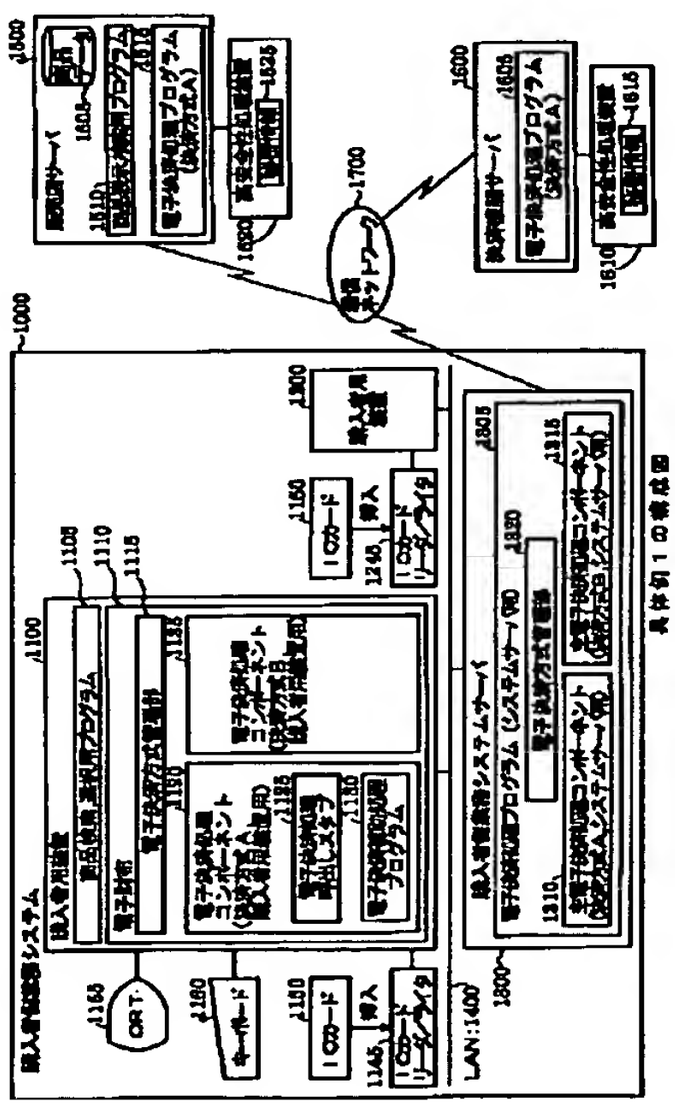
最終頁に続く

(54)【発明の名称】　電子決済システム

(57)【要約】
【課題】　購入者及び販売店間の商品購入の決済を通信ネットワークを介して行う電子決済システムにおいて、購入者用装置に、多種類の決済方式の電子決済処理プログラムを全て実装させたり、使用する決済方式の電子決済処理プログラム全体をダウンロードさせることなく、必要最小限の処理部分を保持させるか、ダウンロードさせるだけで、多種類の決済方式の電子決済処理を可能とする。
【解決手段】　購入者用装置１１００と販売店用装置１５００間の電子決済処理用プログラム全体のうち、購入者用装置には、そこで行うことが必須の処理範囲にとどめた電子決済補助処理プログラム１１３０をもたせ、残余の処理プログラム（主電子決済処理プログラム１３１０）は、購入者用装置と販売店用装置間で機能する主電子決済処理用装置１３００にもたせ、各々必要時に呼び出し合ってそれらの間の電子決済処理全体を実行させることとする。



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【特許請求の範囲】
【請求項１】　購入者用装置及び販売店用装置間での商品購入の決済を通信ネットワークを介して行う電子決済システムにおいて、
少なくとも前記購入者用装置及び販売店用装置間で機能する主電子決済処理プログラムをもつ主電子決済処理用装置を設け、
前記購入者用装置のもつ電子決済処理用のプログラムを、その購入者用装置上で行う必要のある処理範囲にとどめた電子決済補助処理プログラムとして設定し、実行させるものとし、その購入者用装置及び前記販売店用装置間の電子決済の残余の処理は、前記主電子決済処理用装置のもつ主電子決済処理プログラムで実行させることを特徴とする電子決済システム。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、通信ネットワーク、例えばインターネットを介して商品の購入と決済を行う電子商取引のうち電子決済を行う電子決済システムに関するものである。
【０００２】
【従来の技術】最近、通信ネットワーク、特にインターネットを使用して商品の購入と決済を行う電子商取引（ＥＣ：Electronic Commerce）が注目され、その実用化に向けて多くの実験が行われている。このような電子商取引の一機能である電子決済は、実社会の決済を電子的に行うものであり、その方式には、電子マネー方式、オンライン口座資金移動方式、クレジットカード方式等がある。電子マネー方式には、大別して貨幣価値を内容とする情報（貨幣価値情報）を次から次へと流通させることのできる現金型電子マネーと、利用された金額が電子マネーの発行体へ環流するプリペイド型電子マネーがある。クレジットカード方式には、通信路自体を暗号化するＳＳＬ（Secure Socket Layer）プロトコルやクレジットカード決済用に暗号技術を複雑に組み合わせたＳＥＴ（Secure Electronic Transaction）を用いたものが標準的であるが、それ以外にも通信ネットワーク上の販売店で種々の方式が用いられている。
【０００３】いずれにせよ電子決済では、取引相手が目視により確認できないことや、通信ネットワーク上を個人の秘密情報や貨幣価値情報を伝送させる必要があることから、例えばデジタル署名、暗号化あるいは一方向性ハッシュ等の暗号技術を使用してセキュリティ機能を高める必要がある。
【０００４】上記電子決済方式中、電子マネー方式における貨幣価値情報や、デジタル署名又は暗号処理に使用するユーザ用秘密鍵等の秘密情報は、パーソナルコンピュータ等の通信端末に常時接続された記憶装置、例えばハードディスクに格納しておくと、通信ネットワークを介しての他者侵入による破壊，改ざん，盗用等の虞があり、セキュリティ上の危険が大きいため、ＩＣカード中に格納されることが多い。ＩＣカードは、これら貨幣価値情報や秘密情報を格納するだけでなく、それらの情報を使用して入力データに所定の処理を施し、処理結果を出力することができる。例えば、ＩＣカード内のデジタル署名用のユーザ用秘密鍵を使用し入力データにデジタル署名を行って出力することができる。このことからも、多くの電子決済方式において、将来的にＩＣカードの使用が想定されている。

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【０００５】このようなＩＣカードを用いて電子決済を行うシステムの一般的な処理手順を以下に述べる。まず、商品の購入者は、購入者用装置の商品検索，選択用プログラムを使用して購入商品を検索，選択する。購入商品を選択し終えると電子財布を起動し、電子財布がサポートする決済方式中の任意の１つを選択する。これにより決済処理が開始するが、この際、上記ＩＣカードを購入者用装置のＩＣカードリーダ／ライタに挿入しておく。決済処理は、電子財布がサポートする種々の電子決済処理コンポーネント（部品として扱うことのできるプログラム）のうち購入者が選択したものによって行われる。この処理は、通常、販売店サーバのトランザクション処理として、あるいは販売店サーバに決済機関サーバを含めたトランザクション処理として実行される。
【０００６】なお、トランザクション処理中の通信メッセージには、貨幣価値情報や本人認証データ等の重要情報が含まれる。この重要情報は、他者に悪用されたり偽造されたりしないように保持，処理されなければならず、したがって、購入者側においてはＩＣカード内で、販売店や決済機関側においては耐タンパ（tamper）性等を備えた安全性の高い装置内で、保持，処理される必要がある。
【０００７】
【発明が解決しようとする課題】しかしながら上記従来システムでは、次のような問題があった。
（１）上記各電子決済方式は、各々独立に提唱され実験されてきたもので、各方式間の互換性は全くない。したがって、決済時には購入者，販売店が同じ方式で処理する必要があり、購入者，販売店は同じ方式の処理プログラム，装置をもっていなければならない。すなわち、種々の販売店から商品を購入する場合には、各販売店での電子決済毎に各販売店サーバの決済方式で処理する必要があり、購入者用装置として汎用性のある装置を使用した場合でも、その購入者用装置には各種決済方式に対応した種々の電子決済処理プログラムをもつ必要があった。
【０００８】（２）購入者用装置が終始自身で電子決済処理を行うので、高速な電子決済処理を行うためには全ての購入者用装置に高性能が要求された。
【０００９】（３）販売店サーバの決済方式に対応する決済処理プログラムを購入者用装置がもっていない場合

には、決済時に、その販売店の決済方式の決済処理プログラムを販売店サーバから購入者用装置にダウンロードして使用する方法も考えられる。しかしこの方法を従来システムで採る場合、販売店側の決済処理プログラムの全体を購入者用装置にダウンロードする必要があり、通信負荷を高めることになった。

【００１０】本発明は、上記従来システムの問題を解決するためになされたものである。

【００１１】

【課題を解決するための手段】本発明は、上述課題を解決するため次の構成を採用する。購入者用装置及び販売店用装置間での商品購入の決済を通信ネットワークを介して行う電子決済システムにおいて、少なくとも上記購入者用装置及び販売店用装置間で機能する主電子決済処理プログラムをもつ主電子決済処理用装置を設け、上記購入者用装置のもつ電子決済処理用のプログラムを、その購入者用装置上で行う必要のある処理範囲にとどめた電子決済補助処理プログラムとして設定し、実行させるものとし、その購入者用装置及び上記販売店用装置間の電子決済の残余の処理は、上記主電子決済処理用装置のもつ主電子決済処理プログラムで実行させることを特徴とする電子決済システム。

【００１２】

【発明の実施の形態】以下、本発明の実施の形態につき図面を用いて説明する。

《具体例１》

〈具体例１の構成〉図１は、本発明による電子決済システムの具体例１を示す構成図である。ここでは、購入者側業務システムサーバ（主電子決済処理用装置）１３００、販売店サーバ（販売店用装置）１５００及び決済機関サーバ１６００がインターネット等の通信ネットワーク１７００によって接続されたシステム構成を示している。

【００１３】ここで、上記購入者側業務システムサーバ１３００は、ＬＡＮ１４００によって接続された複数台の、ここでは２台の購入者用装置１１００，１２００とで購入者側業務システム１０００を構成している。

【００１４】購入者用装置１１００には、電子商取引を行うための商品検索，選択用プログラム１１０５及び電子財布１１１０が備えられ、また、ＣＲＴディスプレイ（以下、ＣＲＴと略記する。）１１５５、キーボード１１６０及びＩＣカードリーダ／ライタ１１４５が接続されている。

【００１５】上記電子財布１１１０は、電子マネー方式、オンライン口座資金移動方式、クレジットカード方式等、種々の電子決済方式に対応する電子決済処理コンポーネント（部品として扱うことのできるプログラム）を着脱することができる。図示例では、決済方式Ａ（例えばクレジットカード方式），購入者用装置用の電子決済処理コンポーネント１１２０と、他の決済方式、ここでは決済方式Ｂ（例えば電子マネー方式），購入者用装置用の電子決済処理コンポーネント１１３５が装着されている。これら電子決済処理コンポーネント１１２０，１１３５は、電子決済時に実時間で上記購入者側業務システムサーバ１３００からダウンロードすることもできる。

【００１６】電子決済処理コンポーネント１１２０は、購入者側業務システムサーバ１３００の後述電子決済処理プログラム１３０５を呼び出すための電子決済処理呼出しスタブ１１２５と、購入者側業務システムサーバ１３００側からのコールバックに対応する電子決済補助処理プログラム１１３０で構成されている。この電子決済補助処理プログラム１１３０は、購入者用装置１１００及び販売店サーバ１５００間での電子決済処理を行うに当たり、その購入者用装置１１００上で行う必要のある処理範囲にとどめて設定されている。電子決済処理コンポーネント１１３５も、決済方式を異にする点を除き、このような電子決済処理コンポーネント１１２０と同様に構成されている。電子決済方式管理部１１１５は、これらのコンポーネント１１２０，１１３５の管理を行うものである。

【００１７】上記ＣＲＴ１１５５は電子商取引時に種々の情報を表示するＩ／Ｏデバイス、キーボード１１６０は電子商取引時に種々のデータやコマンドを入力するためのＩ／Ｏデバイスである。ＩＣカードリーダ／ライタ１１４５は詳細を後述するＩＣカード１１５０に対して読書きを行うＩ／Ｏデバイスである。

【００１８】他の購入者用装置、ここでは購入者用装置１２００も、決済方式を異にする場合がある点を除き、上記購入者用装置１１００と同様に構成されている。購入者用装置１２００の接続Ｉ／ＯデバイスとしてはＩＣカードリーダ／ライタ１２４５のみ図示されているが、その決済方式に応じてＣＲＴやキーボードも適宜接続される。

【００１９】購入者側業務システムサーバ１３００は、少なくとも購入者用装置１１００，１２００及び販売店サーバ１５００間の電子決済処理を行うための電子決済処理プログラム１３０５を備える。この場合、電子決済処理プログラム１３０５は、電子決済方式管理部１３２０及び種々の決済方式の主電子決済処理コンポーネント（主電子決済処理プログラム）を備えている。ここでは、決済方式Ａ，Ｂ；購入者側業務システムサーバ用の主電子決済処理コンポーネント１３１０，１３１５のみを図示し、それ以外は図示省略されている。

【００２０】上記主電子決済処理コンポーネント１３１０は、購入者用装置１１００及び販売店サーバ１５００間での全電子決済処理範囲から上記電子決済補助処理プログラム１１３０の処理範囲を除いた範囲（購入者用装置１１００，１２００及び販売店サーバ１５００間の全電子決済処理範囲中の大半）の処理を行うように設定さ

れている。主電子決済処理コンポーネント１３１５も、決済方式を異にする点を除き、この主電子決済処理コンポーネント１３１０と同様に構成されている。

【００２１】また、購入者側業務システムサーバ１３００は、電子決済時、必要に応じ、購入者用装置１１００が電子決済処理コンポーネント１１２０を実時間でダウンロード可能に、電子決済処理コンポーネント１１２０相当の電子決済処理コンポーネント（図示せず）を備えて構成されている。この電子決済処理コンポーネントは電子決済処理プログラム１３０５内に独立して設けても、又は上記主電子決済処理コンポーネント１３１０内に包含して設けてもよい。電子決済処理コンポーネント１１３５についても同様である。

【００２２】販売店サーバ１５００は、商品表示，検索用プログラム１５１０及び商品データ１５０５を備え、商品表示，検索用プログラム１５１０が商品データ１５０５を通信ネットワーク１７００上で公開することによって商品を販売している状態にある。この販売店サーバ１５００は、決済方式Ａを採用しており、決済方式Ａの電子決済処理を行う電子決済処理プログラム（決済方式Ａ，販売店サーバ用電子決済処理プログラム）１５１５を備えている。

【００２３】また、販売店サーバ１５００には、デジタル署名や暗号処理に使用する秘密鍵等の秘密情報につき安全性の高い保持，処理が可能な高安全性処理装置１５２０が接続されている。この高安全性処理装置１５２０は、主として販売店サーバ１５００の秘密情報１５２５等を保持し、秘密情報１５２５を使用するデータ処理が可能である。

【００２４】決済機関サーバ１６００は、例えば銀行、クレジット会社又はその代行機関等に設置される。決済機関サーバ１６００は、ここでは決済方式Ａを採用しており、決済方式Ａの電子決済処理を行う電子決済処理プログラム（決済方式Ａ，決済機関サーバ用電子決済処理プログラム）１６０５を備えている。また、決済機関サーバ１６００にも、販売店サーバ１５００における高安全性処理装置１５２０と同様に高安全性処理装置１６１０が接続されている。この高安全性処理装置１６１０は、主として決済機関サーバ１６００の秘密情報１６１５等を保持し、秘密情報１６１５を使用するデータ処理が可能である。

【００２５】図２は、電子決済時に購入者が使用するＩＣカード１１５０の内部構成図である。このＩＣカード１１５０は、ここでは決済方式Ａと決済方式Ｂに対応して構成されており、内部にはカードＯＳ１８０５、決済方式Ａ，ＩＣカード用電子決済処理コンポーネント１８１５、決済方式Ｂ，ＩＣカード用電子決済処理コンポーネント１８２０及び両コンポーネント１８１５，１８２０の管理を行う電子決済方式管理部１８１０が実装されている。また、各決済方式Ａ，Ｂでの決済に必要なデータ１８２５，１８３５が格納されている。決済方式Ａ用データ１８２５には決済処理時に使用される例えば購入者用秘密鍵等の秘密情報１８３０が含まれている。

【００２６】〈具体例１の動作〉次に、上述具体例１の動作について説明する。まず購入者は、購入者用装置１１００上の商品検索，選択用プログラム１１０５を実行し、WWW（World Wide Web）等を使用して通信ネットワーク１７００に接続されている販売店サーバ１５００上の商品表示，検索用プログラム１５１０にアクセスし、ＣＲＴ１１５５の画面上で商品データ１５０５を参照して購入商品を選択する。そして、その商品についての決済処理を行うために電子財布１１１０を起動する。ＩＣカード１１５０は適時ＩＣカードリーダ／ライタ１１４５に装着する。

【００２７】図３は、決済時におけるシステム（主として購入者用装置１１００及び購入者側業務システムサーバ１３００）の動作を示すフローチャートで、以下、この図３を参照して電子財布１１１０の起動後の動作について説明する。販売店サーバ１５００は、ここでは決済方式Ａを採用している。したがって、電子財布１１１０を起動した購入者は、ＣＲＴ１１５５に表示された電子財布１１１０の決済方式選択画面で決済方式Ａを選択し、決済処理を開始する（ステップ１００）。これにより、電子決済処理コンポーネント１１２０中の電子決済処理呼出しスタブ１１２５が電子決済方式管理部１１１５から呼び出される（ステップ１０５）。

【００２８】呼び出された電子決済処理呼出しスタブ１１２５は購入者側業務システムサーバ１３００上の電子決済処理プログラム１３０５に決済処理要求を行う（ステップ１１０）。要求を受けた電子決済処理プログラム１３０５は、電子決済方式管理部１３２０を使用して主電子決済処理コンポーネント１３１０を呼び出す（ステップ１１５）。

【００２９】主電子決済処理コンポーネント１３１０は、本決済処理の主要部として機能するもので、販売店サーバ１５００上の電子決済処理プログラム１５１５との間で通信を行いつつ決済処理を進める（ステップ１２０）。この決済処理においては、購入者の確認を得るために購入者用装置１１００のＣＲＴ１１５５の画面にダイアログ表示等をして、通信中の販売店サーバ名表示や、決済に必要なアカウント番号又はＩＣカード１１５０中の秘密情報１８３０とは別個の秘密情報の入力をさせたりする。また、ＩＣカード１１５０中の秘密情報１８３０を使用するデータ入出力処理、例えば秘密情報１８３０、具体的には購入者用秘密鍵を使用してＩＣカード１１５０に入力されたデータにデジタル署名を行って出力させる処理等も行われる。

【００３０】これらの処理は購入者用装置１１００で行うものであるため、購入者側業務システムサーバ１３００の主電子決済処理コンポーネント１３１０は、購入者

用装置１１００の電子決済補助処理プログラム１１３０に処理要求を行う（ステップ１３０）。

【００３１】要求を受けた電子決済補助処理プログラム１１３０は、上述したような購入者用装置１１００側における購入者の確認を得るための処理やＩＣカード１１５０との間のデータ入出力処理（電子決済補助処理）を行い（ステップ１３５）、結果を主電子決済処理コンポーネント１３１０に返し（ステップ１４０）、処理をステップ１２０に戻す。

【００３２】以上のステップ１２０～１４０は、決済処理が全て終了するまで繰り返される（ステップ１２５）。決済処理が全て終了すると、電子決済処理呼出しスタブ１１２５に処理を返す（ステップ１４５）。

【００３３】なお、決済方式Ａにおける電子決済処理は、実際には上述決済方式Ａの購入者用装置１１００（購入者側業務システムサーバ１３００）及び販売店サーバ１５００間のみならず、決済方式Ａの販売店サーバ１５００及び決済方式Ａの決済機関サーバ１６００間でも行われる。図１では、決済方式Ａの販売店サーバ１５００との電子決済は決済方式Ａの決済機関サーバ１６００上の電子決済処理プログラム（決済方式Ａ，決済機関サーバ用電子決済処理プログラム）１６０５を使用して行われる場合を例示している。この例では、購入者が商品を選択することにより、決済方式Ａの販売店サーバ１５００上の電子決済処理プログラム（決済方式Ａ，販売店サーバ用電子決済処理プログラム）１５１５が決済方式Ａの決済機関サーバ１６００上の上記電子決済処理プログラム１６０５に支払指示を出し、決済機関サーバ１６００との間の決済処理を行う。

【００３４】〈具体例１の効果〉

（１）購入者用装置１１００に、多種類の決済方式の電子決済処理プログラムを全て実装したり、あるいは決済時に使用する決済方式の電子決済処理プログラム全体をダウンロードする必要なしに、必要最小限の処理部分（電子決済処理コンポーネント）を保持するか、ダウンロードするだけで、多種類の決済方式の電子決済処理を行うことができる。

【００３５】（２）高性能の購入者側業務システムサーバ１３００を使用することにより、そのシステムサーバ１３００に接続されている全ての購入者用装置１１００，１２００から高速な電子決済処理を行うことができる。すなわち、購入者用装置１１００，１２００自体は従来システムに比べて高い性能を要求されずに、各購入者用装置１１００，１２００からの高速電子決済処理が可能となる。

【００３６】（３）販売店サーバ１５００の決済方式に対応する電子決済処理プログラムを購入者用装置１１００，１２００がもっていない場合で、決済時に、その販売店サーバ１５００のサポートする決済方式の電子決済処理プログラムを他のサーバ、ここでは購入者側業務システムサーバ１３００から購入者用装置１１００，１２００にダウンロードして使用する方法も考えられる。この方法を本発明システムで採る場合、該当する電子決済処理プログラム（主電子決済処理コンポーネント１３１０，１３１５）の全体ではなく、その一部（電子決済処理コンポーネント１１２０，１１３５に相当する部分）を購入者用装置１１００，１２００にダウンロードすればよいので、通信負荷を高めることはない。

【００３７】（４）本発明システムの主電子決済処理用装置を、購入者側業務システムサーバ１３００として購入者側業務システム１０００内にＬＡＮ１４００を介して購入者用装置１１００，１２００と接続して設けたので、購入者側業務に密着，連動したシステム運用が可能になるという利点もある。また、上記電子決済処理コンポーネント１１２０，１１３５に相当する部分を購入者用装置１１００，１２００にダウンロードする際の通信負荷は、ＬＡＮ１４００にはかかっても、通信ネットワーク１７００には全くかからないという利点もある。

【００３８】《具体例２》

〈具体例２の構成〉図４は、本発明による電子決済システムの具体例２を示す構成図である。ここでは、複数台の、例えば２台の購入者用装置１１００，１２００、電子決済代行サーバ（主電子決済処理用装置）２３００、販売店サーバ（販売店用装置）１５００及び決済機関サーバ１６００がインターネット等の通信ネットワーク１７００によって接続されたシステム構成を示している。

【００３９】購入者用装置１１００には、電子商取引を行うための商品検索，選択用プログラム１１０５及び電子財布１１１０が備えられ、また、ＣＲＴディスプレイ（以下、ＣＲＴと略記する。）１１５５、キーボード１１６０及びＩＣカードリーダ／ライタ１１４５が接続されている。

【００４０】上記電子財布１１１０は、電子マネー方式、オンライン口座資金移動方式、クレジットカード方式等、種々の電子決済方式に対応する電子決済処理コンポーネント（部品として扱うことのできるプログラム）を着脱することができる。図示例では、決済方式Ａ（例えばクレジットカード方式），購入者用装置用の電子決済処理コンポーネント１１２０と、他の決済方式、ここでは決済方式Ｂ（例えば電子マネー方式），購入者用装置用の電子決済処理コンポーネント１１３５が装着されている。これら電子決済処理コンポーネント１１２０，１１３５は、電子決済時に実時間で電子決済代行サーバ２３００からダウンロードすることも可能である。

【００４１】電子決済処理コンポーネント１１２０は、電子決済代行サーバ２３００の後述電子決済処理プログラム２３０５を呼び出すための電子決済処理呼出しスタブ１１２５と、電子決済代行サーバ２３００側からのコールバックに対応する電子決済補助処理プログラム１１３０で構成されている。この電子決済補助処理プログラ

ム１１３０は、購入者用装置１１００及び販売店サーバ１５００間での電子決済処理を行うに当たり、その購入者用装置１１００上で行う必要のある処理範囲にとどめて設定されている。電子決済処理コンポーネント１１３５も、決済方式を異にする点を除き、このような電子決済処理コンポーネント１１２０と同様に構成されている。電子決済方式管理部１１１５は、これらのコンポーネント１１２０，１１３５の管理を行うものである。

【００４２】上記ＣＲＴ１１５５は電子商取引時に種々の情報を表示するＩ／Ｏデバイス、キーボード１１６０は電子商取引時に種々のデータやコマンドを入力するためのＩ／Ｏデバイスである。ＩＣカードリーダ／ライタ１１４５はＩＣカード１１５０に対して読書きを行うＩ／Ｏデバイスである。

【００４３】他の購入者用装置、ここでは購入者用装置１２００も、決済方式を異にする場合がある点を除き、上記購入者用装置１１００と同様に構成されている。購入者用装置１２００の接続Ｉ／Ｏデバイスは図示されていないが購入者用装置１２００の決済方式に応じたＩ／Ｏデバイスが適宜接続されている。

【００４４】電子決済代行サーバ２３００は、少なくとも購入者用装置１１００，１２００及び販売店サーバ１５００間の電子決済処理を行うための電子決済処理プログラム２３０５を備える。この場合、電子決済処理プログラム２３０５は、電子決済方式管理部２３２０及び種々の決済方式の電子決済処理コンポーネント（主電子決済処理プログラム）を備えている。ここでは、決済方式Ａ，Ｂ；電子決済代行サーバ用の主電子決済処理コンポーネント２３１０，２３１５のみを図示し、それ以外は図示省略されている。

【００４５】上記主電子決済処理コンポーネント２３１０は、購入者用装置１１００及び販売店サーバ１５００間での全電子決済処理範囲から上記電子決済補助処理プログラム１１３０の処理範囲を除いた範囲（購入者用装置１１００，１２００及び販売店サーバ１５００間の全電子決済処理範囲中の大半）の処理を行うように設定されている。主電子決済処理コンポーネント２３１５も、決済方式を異にする点を除き、この電子決済処理コンポーネント２３１０と同様に構成されている。

【００４６】また、電子決済代行サーバ２３００は、電子決済時、必要に応じ、購入者用装置１１００が電子決済処理コンポーネント１１２０を実時間でダウンロード可能に、電子決済処理コンポーネント１１２０相当の電子決済処理コンポーネント（図示せず）を備えて構成されている。この電子決済処理コンポーネントは電子決済処理プログラム２３０５内に独立して設けても、又は上記主電子決済処理コンポーネント２３１０内に包含して設けてもよい。電子決済処理コンポーネント１１３５についても同様である。

【００４７】販売店サーバ１５００、決済機関サーバ１６００及びＩＣカード１１５０は上述具体例１と同様に構成されている。

【００４８】〈具体例２の動作〉次に、上述具体例１の動作について説明する。まず購入者は、購入者用装置１１００上の商品検索，選択用プログラム１１０５を実行し、ＷＷＷ（World Wide Web）等を使用して通信ネットワーク１７００に接続されている販売店サーバ１５００上の商品表示，検索用プログラム１５１０にアクセスし、ＣＲＴ１１５５の画面上で商品データ１５０５を参照して購入商品を選択する。そして、その商品についての決済処理を行うために電子財布１１１０を起動する。ＩＣカード１１５０は適時ＩＣカードリーダ／ライタ１１４５に装着する。

【００４９】図５は、決済時におけるシステム（主として購入者用装置１１００及び電子決済代行サーバ２３００）の動作を示すフローチャートで、以下、この図５を参照して電子財布１１１０の起動後の動作について説明する。販売店サーバ１５００は、ここでは決済方式Ａを採用している。したがって、電子財布１１１０を起動した購入者は、ＣＲＴ１１５５に表示された電子財布１１１０の決済方式選択画面で決済方式Ａを選択し、決済処理を開始する（ステップ２００）。これにより、電子決済処理コンポーネント１１２０中の電子決済処理呼出しスタブ１１２５が電子決済方式管理部１１１５から呼び出される（ステップ２０５）。

【００５０】呼び出された電子決済処理呼出しスタブ１１２５は電子決済代行サーバ２３００上の電子決済処理プログラム２３０５に決済処理要求を行う（ステップ２１０）。要求を受けた電子決済処理プログラム２３０５は、電子決済方式管理部２３２０を使用して主電子決済処理コンポーネント２３１０を呼び出す（ステップ２１５）。

【００５１】主電子決済処理コンポーネント２３１０は、本決済処理の主要部として機能するもので、販売店サーバ１５００上の電子決済処理プログラム１５１５との間で通信を行いつつ決済処理を進める（ステップ２２０）。

【００５２】この決済処理においては、購入者の確認を得るために購入者用装置１１００のＣＲＴ１１５５の画面にダイアログ表示等をして、通信中の販売店サーバ名表示や、決済に必要なアカウント番号又はＩＣカード１１５０中の秘密情報１８３０とは別個の秘密情報の入力をさせたりする。また、ＩＣカード１１５０中の秘密情報１８３０を使用するデータ入出力処理、例えば秘密情報１８３０、具体的には購入者用秘密鍵を使用してＩＣカード１１５０に入力されたデータにデジタル署名を行って出力させる処理等も行われる。

【００５３】これらの処理は購入者用装置１１００で行うものであるため、電子決済代行サーバ２３００の主電子決済処理コンポーネント２３１０は、購入者用装置１

１００の電子決済補助処理プログラム１１３０に処理要求を行う（ステップ２３０）。

【００５４】要求を受けた電子決済補助処理プログラム１１３０は、上述したような購入者用装置１１００側における購入者の確認を得るための処理やＩＣカード１１５０との間のデータ入出力処理（電子決済補助処理）を行い（ステップ２３５）、結果を主電子決済処理コンポーネント２３１０に返し（ステップ２４０）、処理をステップ２２０に戻す。

【００５５】以上のステップ２２０～２４０は、決済処理が全て終了するまで繰り返される。決済処理が全て終了すると、電子決済処理呼出しスタブ１１２５に処理を返す（ステップ２４５）。

【００５６】なお、決済方式Ａにおける電子決済処理は、実際には上述決済方式Ａの購入者用装置１１００（電子決済代行サーバ２３００）及び販売店サーバ１５００間のみならず、決済方式Ａの販売店サーバ１５００及び決済方式Ａの決済機関サーバ１６００間でも行われる。図４では、決済方式Ａの販売店サーバ１５００との電子決済は決済方式Ａの決済機関サーバ１６００上の電子決済処理プログラム（決済方式Ａ，決済機関サーバ用電子決済処理プログラム）１６０５を使用して行われる場合を例示している。この例では、購入者が商品を選択することにより、決済方式Ａの販売店サーバ１５００上の電子決済処理プログラム（決済方式Ａ，販売店サーバ用電子決済処理プログラム）１５１５が決済方式Ａの決済機関サーバ１６００上の上記電子決済処理プログラム１６０５に支払指示を出し、決済機関サーバ１６００との間の決済処理を行う。

【００５７】〈具体例２の効果〉

（１）購入者用装置１１００に、多種類の決済方式の電子決済処理プログラムを全て実装したり、あるいは決済時に使用する決済方式の電子決済処理プログラム全体をダウンロードする必要なしに、必要最小限の処理部分（電子決済処理コンポーネント）を保持するか、ダウンロードするだけで、多種類の決済方式の電子決済処理を行うことができる。

【００５８】（２）高性能の電子決済代行サーバ２３００を設置することにより、その代行サーバ２３００に接続されている全ての購入者用装置１１００，１２００から高速な電子決済処理を行うことができる。すなわち、購入者用装置１１００，１２００自体は従来システムに比べて高い性能を要求されずに、各購入者用装置１１００，１２００からの高速電子決済処理が可能となる。

【００５９】（３）販売店サーバ１５００の決済方式に対応する電子決済処理プログラムを購入者用装置１１００，１２００がもっていない場合で、決済時に、その販売店サーバ１５００のサポートする決済方式の電子決済処理プログラムを他のサーバ、ここでは電子決済代行サーバ２３００から購入者用装置１１００，１２００にダウンロードして使用する方法も考えられる。この方法を本発明システムで採る場合、該当する電子決済処理プログラム（主電子決済処理コンポーネント１３１０，１３１５）の全体ではなく、その一部（電子決済処理コンポーネント１１２０，１１３５に相当する部分）を購入者用装置１１００，１２００にダウンロードすればよいので、通信負荷を高めることはない。

【００６０】（４）本発明システムの主電子決済処理用装置を、電子決済代行サーバ２３００として購入者用装置１１００，１２００とは独立して通信ネットワーク１７００上に設置したので、具体例１の購入者側業務システム１０００等、他のシステムの制約を受けることなく構成し、機能させ得、具体例１に比べてより多機能，高機能な電子決済処理が可能になるという利点もある。

【００６１】なお、上述具体例１，２のいずれも、販売店サーバ１５００の電子決済処理プログラムとしては決済方式Ａのもの（プログラム１５１５）のみ備えた場合について述べたが、これのみに限定されることはない。その他の１又は複数の、例えば、決済方式Ｂの販売店サーバ用電子決済処理プログラムをも備え、購入者用装置１１００，１２００との間で任意に選択されたＡ，Ｂいずれかの決済方式の電子決済処理プログラムを用いて電子決済を行うようにしてもよい。

【図面の簡単な説明】

【図１】本発明システムの具体例１を示す構成図である。

【図２】図１中のＩＣカードの内部構成図である。

【図３】具体例１の動作を示すフローチャートである。

【図４】本発明システムの具体例２を示す構成図である。

【図５】具体例２の動作を示すフローチャートである。

【符号の説明】

１０００　購入者側業務システム

１１００，１２００　購入者用装置

１１０５　商品検索，選択用プログラム

１１１０　電子財布

１１２０　決済方式Ａ，購入者用装置用電子決済処理コンポーネント

１１３０　決済方式Ａの電子決済補助処理プログラム

１１３５　決済方式Ｂ，購入者用装置用電子決済処理コンポーネント

１１５０　ＩＣカード

１３００　購入者側業務システムサーバ（主電子決済処理用装置）

１３１０　決済方式Ａ，購入者側業務システムサーバ用主電子決済処理コンポーネント（主電子決済処理プログラム）

１３１５　決済方式Ｂ，購入者側業務システムサーバ用主電子決済処理コンポーネント（主電子決済処理プログラム）

13

１４００　ＬＡＮ
１５００　販売店サーバ（販売店用装置）
１５０５　商品データ
１５１０　商品表示，検索用プログラム
１５１５　決済方式Ａ，販売店サーバ用電子決済処理プログラム
１６００　決済機関サーバ
１６０５　決済方式Ａ，決済機関サーバ用電子決済処理

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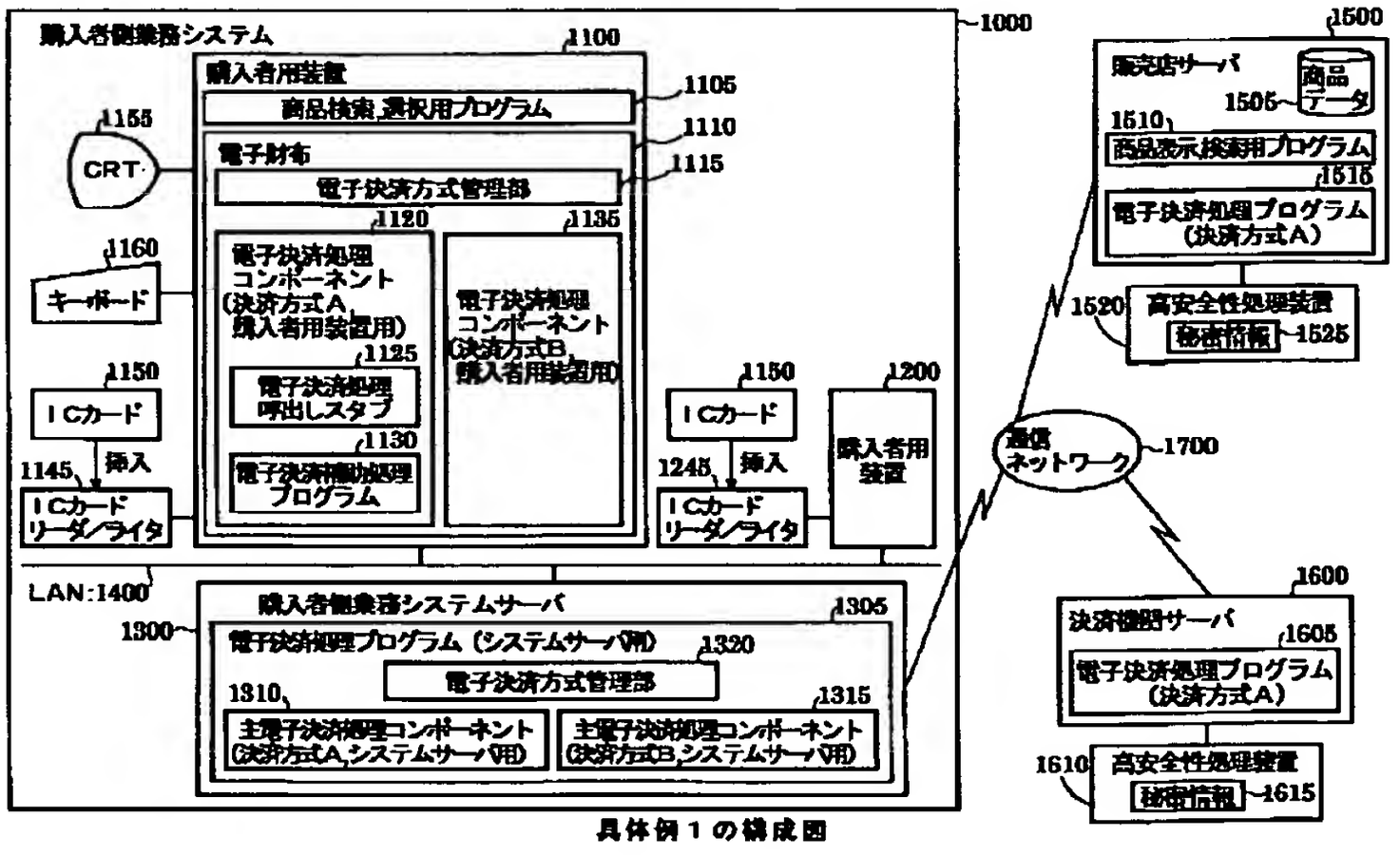
プログラム
１７００　通信ネットワーク
２３００　電子決済代行サーバ（主電子決済処理用装置）
２３１０　決済方式Ａ，電子決済代行サーバ用主電子決済処理コンポーネント（主電子決済処理プログラム）
２３１５　決済方式Ｂ，電子決済代行サーバ用主電子決済処理コンポーネント（主電子決済処理プログラム）

【図１】



具体例１の構成図

【図２】

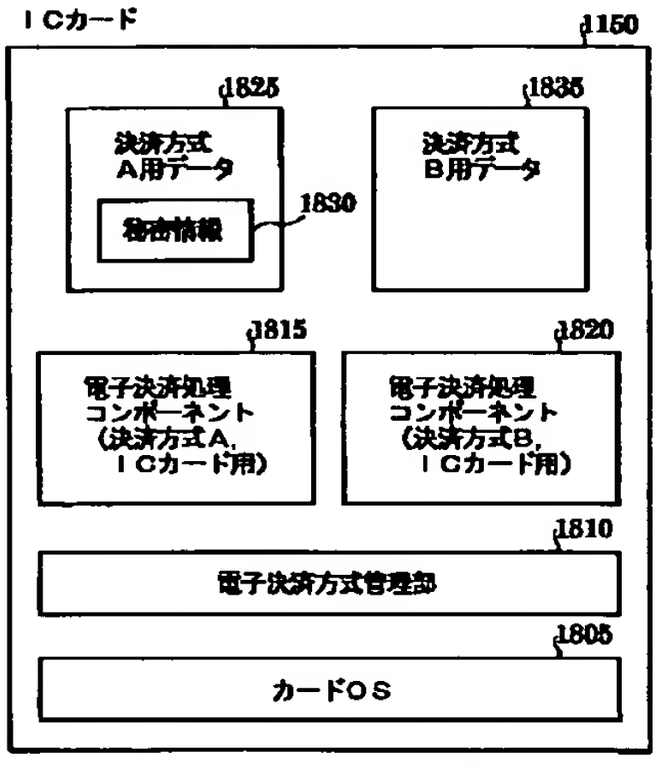
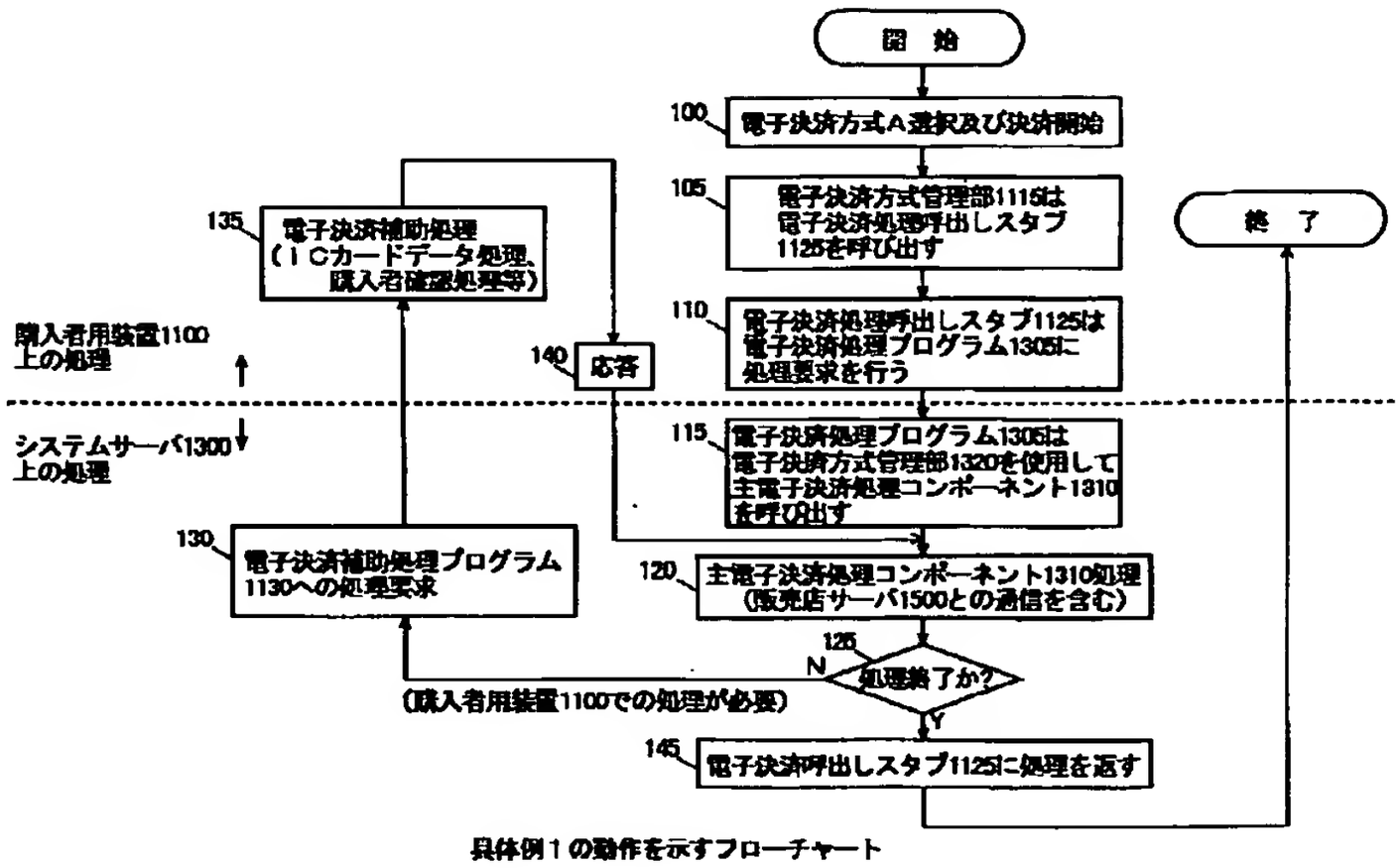


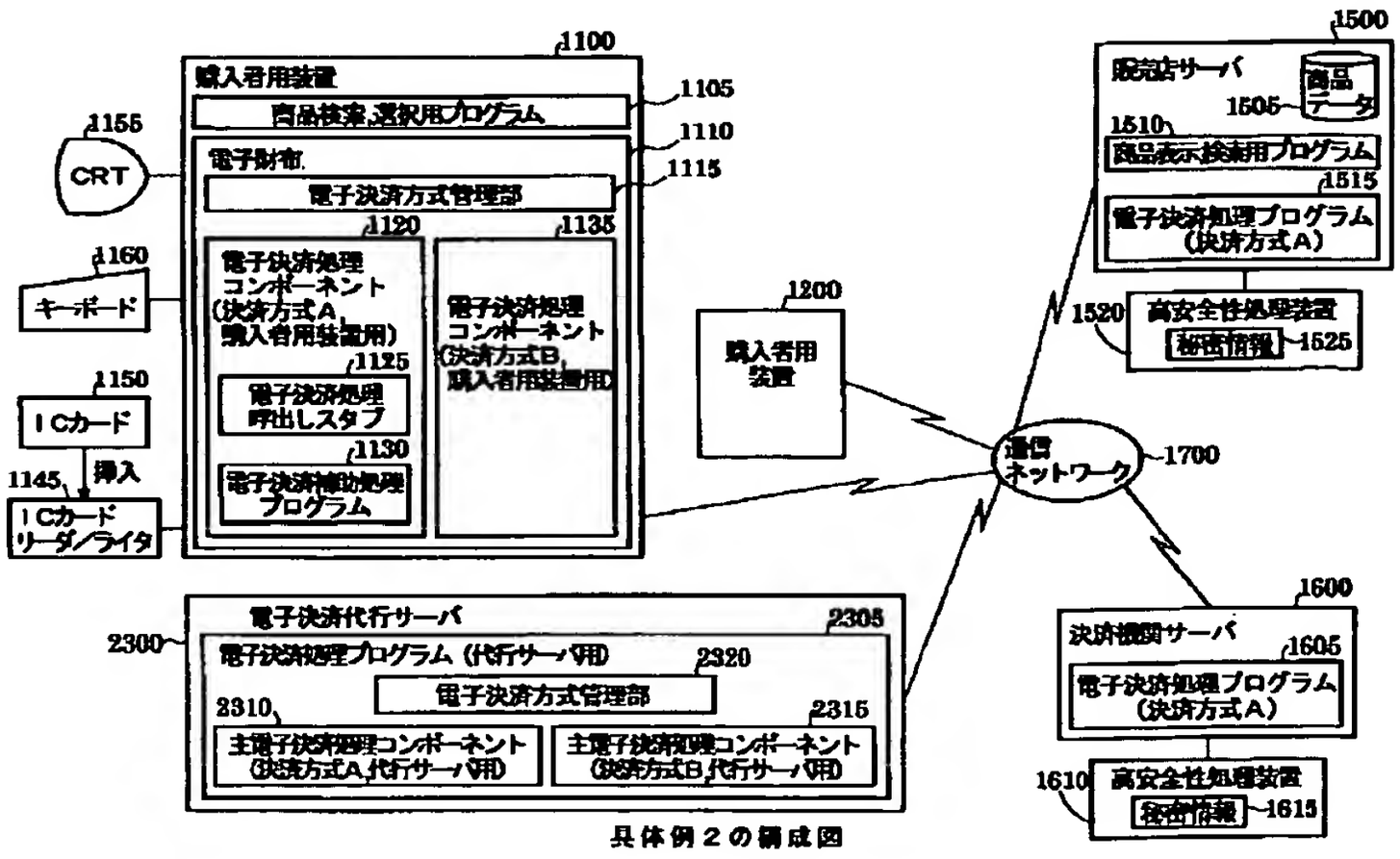
図１中のＩＣカードの内部構成図

【図３】



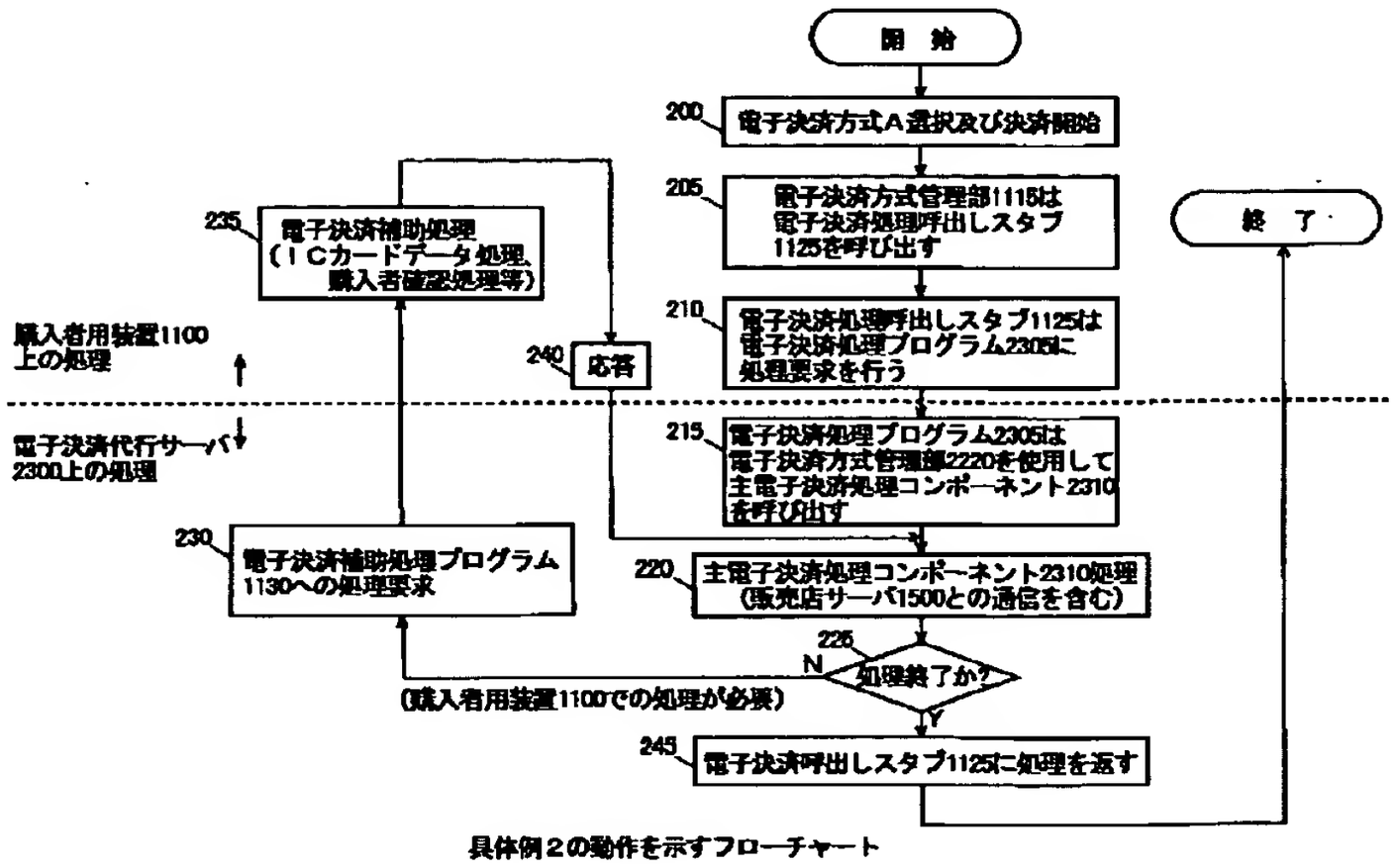
具体例１の動作を示すフローチャート

【図４】



具体例２の構成図

【図５】



具体例２の動作を示すフローチャート

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C nflict resolution: Guiding members toward agreement

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Abstract (Article Summary)

Many associations are suffering from the combination of a weak economic recovery and the consequences of the mergers, corporate takeovers, and deregulation that characterized the 1980s. Troubled times mean that conflict is increasingly common. Conflict can spell disaster for associations and significant distress for top association staff. However, when handled correctly, conflict can allow associations to rejuvenate, cast off entrenched ways of thinking, and emerge healthier and more dedicated to quality service. The different types of conflict include special interests, different values, and personal friction. Association executives can play a role in the resolution of conflict by facilitating negotiations. Ideally, executives help clarify the group's objectives but remain uncommitted to any particular outcome. In addition, the association chief executive or senior staff can help members deal with conflict by: 1. defining the issues, 2. creating an agenda for discussion, 3. gathering information, 4. reading between the lines, 5. brainstorming, and 6. identifying possible settlements.

Full Text (2080 words)

After more than a year of negotiations, my national trade association merged with another representing the same industry. While the new board posed for official photos, dissent was seething beneath members' apparent cordiality. The board was sharply divided about the future of the new association.

The controversy reflected the changing nature of the industry itself. Ten years of deregulation had encouraged the growth of competition. As competition redefined the industry, each company sought to maximize its chances for success in the turbulent new marketplace.

As an association executive director experienced in negotiating and building consensus, I thought I knew how to

handle my association's problems. But today the new association's future remains unclear, and the conflict eventually caused me to leave. This experience led me to further study the dynamics of conflict in associations, where I discovered the importance of dispute-resolution skills for association executives.

Like my group, many associations are suffering from the combination of a weak economic recovery and the consequences of the mergers, corporate takeovers, and deregulation that characterized the 1980s. Nationwide, association revenues have been down for several years. Boards have faced greater than normal turnover. Staff cuts have hampered associations' ability to provide a traditional range of member services. Troubled times mean that conflict, inherent to any confederation of people with differing needs and ideas, is increasingly common.

Conflict can spell disaster for associations and significant distress for top association staff. But when handled correctly, conflict can allow associations to rejuvenate, cast off entrenched ways of thinking, and emerge healthier and more dedicated to quality service.

TYPES OF CONFLICT

SPECIAL INTERESTS. My former association remains deeply divided by the who-gets-what sort of conflict. One group favors more industry deregulation to benefit newcomers, while another group wants to protect the privileges of established companies. Members also disagree on programs. Information services valuable to smaller companies, for example, are scoffed at by members representing large, multinational organizations. From my experience starting up two new associations, I find these interest-based conflicts the most common in associations.

DIFFERENT VALUES. Conflict based on different values commonly reveals itself in disputes about professional standards of conduct or codes of ethics established by associations. For example, the American Medical Association, Chicago, last fall experienced a divisive conflict about code of ethics changes prohibiting doctors from referring patients to laboratories and clinics owned by the referring doctor. The issue eventually went to the membership for a vote.

PERSONAL FRICTION. Interpersonal conflict is often a factor in board disputes. Even if poor communication is not the cause of conflict, it often serves to intensify friction. Here are four sources to beware of:

1. MISPERCEPTIONS OR STEROTYPES PREVENT PEOPLE FROM SEEING ANOTHER' POINT OF VIEW. I dealt with a conflict between representatives of small and large companies in which the small firm rep assumed the large one had access to deep corporate pockets and therefore shouldn't argue about costs.

2. COMMUNICATION CAN BE SUBJECT TO MISINTERPRETATION. When your chief elected officer tells the finance committee leader, "There was an error in the numbers last month," the finance head may hear, "You're not doing your job well."

3. NEGATIVE BEHAVIOR SUCH AS DOMINATING CONVERSATION AND FAILING TO RESPECT RIGHTS OF OTHERS SEES ILL WILL AND INHIBITS COOPERATION. I've often seen board newcomers undermine their own good ideas by being too forceful in trying to sell them.

4. EMOTIONS LIKE ANGER AND RESENTMENT OFTEN PREVENT CLEAR COMMUNICATION. One board member may object to the content of a report, for example, while the report's author feels personally attacked.

WHEN TO SEEK OUTSIDE HELP

In some association disputes, it's wise to call in a professional mediator or respected outside party known to both sides. Consider the involvement of a third party in any of the following situations:

* Staff has taken a side in the dispute or members have become suspicious of staffs neutrality.

* Communication among the members or between members and staff is poor.

* Members have become intensely emotional about the conflict, and either these emotions are preventing a settlement or resulting negative behaviors are creating barriers to useful discussion.

* Misperceptions, stereotypes, or perceived value differences are hindering productive exchanges.

* There are serious disagreements over data, particularly internally generated data.

* There are multiple issues in dispute and members can't agree about the procedure for addressing them.

* The parties have been unable to resolve their dispute using other procedures.

THE CEO'S ROLE IN CONFLICT

The savvy association executive anticipates conflict and arranges to avoid its outbreak. Don't put people together who don't get along. Avoid ruffling feathers with obvious special treatment. On policy issues, be sure all parties receive good briefing materials and have time to digest the information prior to discussion.

Once conflict emerges, however, it can't be suppressed. Members may be reluctant to publicly voice disagreements. While letting them keep silent may seem the easy way out of a difficult situation, inevitably disagreement will boil over. A pattern of conflict can also spell trouble for the group's future. Airing conflict allows an association to consider whether goals, programs, and procedures suit the current membership.

When conflict escalates to the point that members take action--whether publicly, within the board, or in private meetings--conflict has become embedded. As the conflict proliferates, board members may expand the conflict's themes by making generalized and polarizing comments, such as "and another thing I don't like" or "the whole system stinks." Opposing sides may cut off communication while each reaches out to build allies among the membership.

As the association divides itself into opposing camps, the chief executive officer will feel pressured to resolve the conflict. As I have learned from experience, staff should not assume too much personal responsibility in this area. If you try to resolve an embedded conflict behind closed doors, you risk being seen as the source of the trouble.

Remember, too, that it is the association members who are in conflict, not you or the staff. Any viable solution must be member generated, and members must hold an ownership interest in it if it is to work. As chief executive officer, your role is to facilitate negotiations. Never allow yourself to become the spokesperson for one side. Instead, enlist your members to carry the argument. Ideally, you help to clarify the group's objectives but remain uncommitted to any particular outcome.

ROUTES TO A SOLUTION

What else can the association chief executive or senior staff do to help members deal with conflict?

DEFINE THE ISSUE. Make certain the problem is properly and fully defined. I have seen groups argue for hours only to discover that they were talking about two different things. Ask your members to clearly articulate their concerns and make sure each side has really heard the other.

Get the parties to agree on a definition of the problem. Often association controversies have more than one component. A classic example is hammering out an official position on a piece of legislation that may have several components. Make sure all facets of the problem are on the table.

CREATE AN AGENDA FOR DISCUSSION. Reframe the debate as a problem your members share: This is the critical step in beginning the process of resolution. Begin to develop an environment of agreement by seeking out and reinforcing areas where your members agree. The budget as a whole may be controversial, for instance, but it is likely you can find one project or area the members can agree on. Suggest that they segment off easier pieces that can be resolved first to build a history of agreement. Above all, your job is to keep the parties talking. your information, As the controversy develops, learn as much as you can about the problem and the needs of each side. Often there is a lot going on in a conflict that doesn't appear on the surface.

Have a one-to-one conversation with each of the major players, being sure to maintain your own neutrality. You will likely find personal agendas involving a desire for recognition or status. Board conflicts sometimes hide an

individual's goal to be known for resolving a major issue. You may also discover professional or corporate goals that motivate parties. Board members may be bound by their company's position on a legislative matter, for example. While you need to be discreet about confidential matters, you can often find a key to solving the controversy by accommodating hidden goals. Perhaps the desired recognition can come from a different source.

READ BETWEEN THE LINES. Don't overlook underlying motives, for these are often the most powerful factors at work in a conflict. I learned from my association's conflict that you can't expect members to put aside personal or corporate goals for the good of the group.

Be particularly aware of what goes on in association subcultures. Here, personal relationships and trust count heavily. Find out who is calling whom to discuss the problem and what your members really think. Often what people say in the board room differs radically from what they say privately to other board members. Keep tuned in to these differences and tactfully find a way for people to air their private concerns.

Members may have specific instructions from their companies; talk with them about alternative ways to meet those needs. If the issue at hand is controversial, members may also have public relations concerns; help out with strategies for framing their positions publicly.

BRAINSTORM. Often parties get bogged down generating ideas. Staff can help by stimulating discussion. Help members find as many ways as possible to solve the problem. Resist efforts to reject or accept any particular idea at this stage. List several alternative solutions before discussing the merits of any one.

Suggest dividing the problem into smaller pieces that are easier to tackle and that imply possible trade-offs. Encourage members to agree to disagree on values or goals, or help them search for goals or values that all can share. A piece of legislation, for example, may cover eight issues; two affect one part of the membership, two another part, and four affect everyone. The parties can try to compromise so that all of them enjoy some benefit.

Keep your members focused on interests, not positions. Try not to let the positions of each side harden. Hypothetical and open ended questions often help people see things from others' points of view.

IDENTIFY POSSIBLE SETTLEMENTS. Privately assess the options, seeking a settlement range--that is, if the opposing parties represent the extremes, stake out the middle ground. Look for solutions that meet the needs of all sides and be sure of the workability of possible settlements. Provide feedback to members on what you see, but never try to impose a solution. The best tactic is to suggest two or three alternatives that might be workable solutions.

Being aware of some common barriers to settlement can help you guide members toward agreement:

* If you don't clearly define the problem or conflict, finding a solution may be nearly impossible.

* If negotiations fail to address major concerns or the needs of each side, no solution will satisfy all parties.

* If important decision makers are missing from the table, an agreement may not be enforceable.

* If those who are at the table cannot assure the support of member constituencies, an agreement may not be workable.

* If you gather insufficient information, you may miss possible solutions.

* If members evaluate their brainstormed ideas prematurely, they may reject some good ideas.

* If parties don't trust each other, they may never agree on a settlement that is workable. If trust is not possible, you must develop a process for enforcement.

Conflict management skills will be an increasingly important part of the association executive's repertoire. As associations move into the mid-1990s, both increasing work force diversity and decreasing economic resources mean many will face conflict. With conflict come both opportunity and challenge, however. Conflict moves

associations ahead, allowing them to cast off entrenched but unproductive programs or policies and to emerge more dedicated to member needs. Conflict can also create stagnation and major headaches. But learning how to handle conflict will enable association staff and members to end up with a more effective organization.

Christine Nolin, who spent seven years as an association chief staff executive, is a management consultant and mediator with the Mediation Group of Maryland, Silver Spring. She has been appointed to the panel of arbitrators of the American Arbitration Association, New York City.

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MANAGEMENT SCIENCE

Using computers to realize joint gains in negotiations: Toward an "electronic bargaining table"

Arvind Rangaswamy, *G Richard Shell*. **Management Science**. Providence: Aug 1997. Vol. 43, Iss. 8; pg. 1147, 17 pgs

» Jump to full text

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Abstract (Article Summary)

Multiissue negotiations present opportunities for tradeoffs that create gains for one or more parties without causing any party to be worse off. The literature suggests that parties are often unable to identify and capitalize on such trades. A Negotiation Support System called NEGOTIATION ASSISTANT that enables negotiators to analyze their own preferences and provides a structured negotiation process to help parties move toward optimal trades is presented. The underlying model is based on a multiattribute representation of preferences and communications over a computer network where offers and counteroffers are evaluated according to one's own preferences. The parties can send and receive both formal offers and informal messages. If and when agreement is reached, the computer evaluates the agreement and suggests improvements based on the criteria of Pareto-superiority. Parties using the system in structured negotiation settings would achieve better outcomes than parties negotiating face to face or over an e-mail messaging facility, other things being equal.

Full Text (9903 words)

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[Headnote]
Multiissue negotiations present opportunities for tradeoffs that create gains for one or more parties without causing any party to be worse off. The literature suggests that parties are often unable to identify and capitalize on such trades. We present a Negotiation Support System, called NEGOTIATION ASSISTANT, that enables negotiators to analyze their own preferences and provides a structured negotiation process to help parties move toward optimal trades. The underlying model is based on a multiattribute representation of preferences and communications over a computer network where offers and counteroffers are evaluated according to one's own preferences. The parties can send and receive both formal offers and informal messages. If and when agreement is reached, the computer evaluates the agreement and suggests improvements based on the criteria of Pareto-superiority. In this paper, we motivate the system, present its analytical foundations, discuss its design and development, and provide an experimental assessment of its "value-in-use." Our results strongly suggest that parties using the system in structured negotiation settings would achieve better outcomes than parties negotiating face to face or over an e-mail messaging facility, other things being equal. For example, only 4 of the 34 dyads (11.1%) negotiating a simulated sales transaction face to face or over e-mail reached an "integrative" settlement, as compared with 29 of the 68 dyads (42.6%) using NEGOTIATION ASSISTANT. Systems such as NEGOTIATION ASSISTANT have the potential to be used in emerging "electronic markets."
(Negotiation; Decision Support System; Pareto Efficiency; Conjoint Analysis)

1. Introduction

In the past decade, there has been increasing interest in the application of computer technologies to facilitate negotiations.l Using a variety of modeling approaches and spurred by the demands of real-world negotiating environments, the field of Negotiation Support Systems (NSS) is now developing along a number of innovative lines. These range from the design of specialized expert systems that help negotiators prepare for a negotiation, to mediation and interactive negotiation systems that restructure the way negotiations actually take place.

There are at least two reasons for this growing research interest in computer-supported negotiations. First, research consistently suggests that conventional face-to-face negotiations often lead to inefficient outcomes, i.e., settlements that can be improved upon for all parties (e.g., Dwyer and Walker 1981, Gupta 1989, Neale and Bazerman 1991, and Sebenius 1992). NSS offer the promise of improving negotiation outcomes for the negotiating parties by helping them prepare for a negotiation, and/or by providing computer-structured mechanisms to order the negotiation process. Second, business transactions are increasingly being conducted over computer networks, but without dedicated software support. Securities trading is already computerized, and the use of computers to assist other kinds of trades is spreading rapidly (e.g., Konstadt 1991). The growth of networked systems such as the Internet, consumer online services, and Lotus Notes portend greater use of computer-mediated negotiations. NSS can facilitate negotiations in these emerging electronic "bargaining tables" by providing systematic models that structure network negotiations and render them more economically productive.

This paper presents an NSS model to facilitate negotiation over computer networks and describes an experiment to investigate whether the use of the system helps parties locate and execute tradeoffs that maximize the gains from trade in multiissue negotiations. The system, called NEGOTIATION ASSISTANT (hereafter referred to as NA), is based on concepts drawn from the emerging field of negotiation analysis and provides parties with both preparation tools and an "electronic bargaining table" for two-party, multiissue negotiations. The contributions of this research are twofold: From an academic perspective, it provides an analysis of a plausible alternative to a face-to-face negotiation process, a field of increasing interest as evidenced by papers devoted to this topic in the special issue of Management Science (October 1991). From a practical perspective, it points to the emergence of workable mechanisms to enhance outcomes of business transactions over computer networks.

2. Background A Framework for System Development

For computers to add measurable value to the negotiation process, NSS design must be linked to a conceptual framework of negotiation that categorizes various structures under which negotiations take place and stipulates criteria for evaluating outcomes. Walton and McKersie (1965) make the important distinction between "distributive" bargaining in which parties bargain over a fixed pie, and "integrative" bargaining in which parties may "expand the pie" through problem solving, creativity, and identification of differences in priorities and/or compatibility of interests. Research on integrative bargaining suggests that parties negotiating face to face often have difficulty in bargaining in ways that permit them to identify and realize integrative tradeoffs. Thus, many negotiations are characterized by suboptimal tradeoffs, failed communication, and lost opportunities (Pruitt 1981). The fact that parties leave money on the table has led to a search for systematic ways to help parties achieve more integrative settlements, a search that has given rise to the emerging field of "negotiation analysis." Here, we summarize the key precepts of this area. Sebenius (1991) and Young (1991) provide comprehensive reviews.

Unlike purely anecdotal approaches to bargaining (e.g., Cohen 1980), negotiation analysis uses formalisms and analytical approaches that are based on models used in economics, decision analysis, and game theory. However, unlike the pure forms of these theoretical models, negotiation analysis seeks to incorporate realistic assumptions about the way negotiations are actually conducted. For example, neither side is stipulated to act in accord with the precepts of game-theoretic rationality. Rather, both sides are expected to conduct themselves based on their subjective assessments of each other in the light of the usually imperfect information actually available to them. Sebenius (1991) characterizes this approach as "nonequilibrium game theory with bounded rationality and without common knowledge." An important aspect of negotiation analysis has been the application of various tools from decision analysis, including multiattribute utility assessment to help parties prepare for negotiations (Raiffa 1982, pp. 133165). Negotiation analysis seeks ways to "anticipate the likelihood of ex-post Pareto-inefficient agreements, in order to identify ways to help the parties to `expand the pie'"" (Sebenius 1991, p. 21).2 Finally, negotiation analysis eschews the search for unique equilibria and solution concepts such as are found in cooperative game theory, and focuses instead on subjective perceptions of possible zones of agreement, with the objective of identifying agreements that are "among the best" available to the parties. In operational terms, negotiation analysis is used for developing methods to achieve integrative settlements by giving negotiators decision-analytic and other tools to help them articulate their own preferences clearly, and to help one or more parties match up their preferences with those of other parties during the negotiation process.

Existing Negotiation Support Systems. Many existing NSS have explicitly or implicitly relied on some of the concepts of negotiation analysis as a basis for their design. Several of these systems are summarized in Jelassi and Faroughi (1989). NSS may be classified as follows: (1) Preparation and evaluation systems that operate away from the bargaining table to help individuals privately organize information, develop preference representations, refine prenegotiation strategies, or evaluate midnegotiation offers, and (2) Process support systems that operate at or in lieu of a bargaining table. These systems restructure the dynamics and procedures of the negotiation process in order to make salient the possible gains from integrative bargaining (Thiessen and Loucks 1992). Thus, process support systems are designed not only to assist parties in gaining a subjective representation of the negotiation situation, but also to help negotiators to move toward more integrative settlements.

Examples of preparation systems include NEGOPLAN (Kersten et al. 1991), NEGOTEX (Rangaswamy et al. 1989), and GMCR (Fang et al. 1993). In addition to these formal preparation systems, generic decision analysis and spreadsheet software packages are also used in preparing for both negotiation and mediation (Nagel and Mills 1990). Process support systems may be further subdivided into two types: mediation systems and interactive bargaining systems. In mediation systems, a computer model substitutes for or assists a human mediator to prompt the parties toward jointly optimal agreements. Communications among parties using a mediation system are filtered through the computer or a human mediator, although the parties remain in control of the outcome. Interactive bargaining systems simultaneously support the negotiation processes of all the parties, and enable the parties to communicate directly with each other over computer networks. Interactive systems may also contain a function for computer-assisted mediation. Examples of process support systems include PERSUADER (Sycara 1990,1991), and ICANS (Thiessen and Loucks 1992), and the proposed NA system.

We make the following summary observations regarding NSS models and systems reported in the literature. First, among the existing systems, GMCR, ICANS, and NA have more closely relied on the concepts of negotiation analysis. NA is closest to ICANS in this regard. However, NA differs in significant ways in its design and operation compared to its predecessors. First, NA is designed to be more of a facilitator, rather than a mediator. In particular, it is a fully interactive system that allows negotiators to communicate directly with one another over computer networks. Second, NA uses design principles that are somewhat different from the approaches used in Group Decision Support Systems (GDSS). In particular, NA does not require the same high degree of collaboration between parties that is characteristic of GDSS, but may be difficult to establish in real-world negotiation settings. In this sense, NA is differentiated from systems such as PERSUADER, MEDIATOR (Jarke et al. 1987), DECISION CONFERENCING,3 and other GDSS such as those developed by Nunamaker et al. (1991). For a review of the GDSS area, see Rao and Jarvenpaa (1991).

Evaluation of NSS. Few studies have systematically examined the impact of computer-assisted negotiation preparation or computer-mediated communications during negotiation. Although it is generally believed that prior preparation by the parties will enhance negotiation outcomes (e.g., Raiffa 1982, pp. 119-122), there is very litt published in the academic literature that has explored the benefits and limitations of computer preparation tools (Lim and Benbasat 1993). The only reported tests we could find were experiments to evaluate ICANS (Thiessen and Loucks 1992) and NEGOTEX (Eliashberg et al. 1993).

There is some published research that has compared computer-mediated communication with face-to-face

communication in group decision tasks. This literature suggests that computer-mediated communication has the following effects: (1) reduces the communication bandwidth, thereby resulting in fewer exchanges of information (Arunachalam and Dilla 1995), although the proportion of task-related information exchanges are somewhat higher (Siegel et al. 1986); (2) increases anonymity, which could lead to less cooperative behavior (Wichman 1970, Arunachalam and Dilla 1995) and more uninhibited behavior (Siegel et al. 1986); and (3) restricts spontaneous expression because of the need (perceived or actual) to take turns communicating.

Experimental evidence suggests that computermediated communication enhances outcomes in some interactive decision tasks, but diminishes outcomes in other tasks. Nunamaker et al. (1991) provide evidence that computer-mediated groups tend to be efficient and effective in generating options for mutual gain. Siegel et al. (1986) show that in the context of risky choice, computer-mediated communication groups shifted further away from members' initial individual choices than groups that followed face-to-face discussions. Hiltz et al. (1986) conclude that the quality of decisions was equally good for these two modes of communication, but there was greater agreement on decisions among the group members in the face-to-face groups. Their experiments also suggest that while computerized conferences were rated as satisfactory, face-to-face meetings were consistently rated as more satisfactory.

A couple of studies have more directly examined the role of the "mode of communication" in influencing outcomes in negotiations. In the context of a single-issue negotiation with asymmetric information, Valley et al. (1995, p. 13) provide evidence that face-to-face negotiations resulted in significantly more mutually beneficial outcomes than negotiations where the parties used written offers and messages that were transmitted by messengers (simulating an e-mail facility). In the context of a multiple-issue negotiation, Arunachalam and Dilla (1995) also report that as compared to the use of an email messaging system, face-to-face negotiation leads to higher individual and group profits. This is the only study that we are aware of that has examined outcomes associated with computer-mediated communication in a context where the proposed NA is likely to be useful.

In summary, past studies have only provided modest and inconsistent insights for assessing the impact that systems such as NA will have on the process and outcomes of negotiations. In this study, we attempt to isolate the effects of computer-assisted preparation and computer-facilitated communication in the context of a multiple-issue, integrative bargaining problem.

3. Negotiation Assistant: Design and Operation

In this section, we first describe the design criteria for the NA system, and relate these criteria to the appropriate concepts described in the previous section. Next, we provide a description of the operation of the system.

Design Criteria

Moving Toward Pareto-Efficiency. The NA system is designed to foster more efficient outcomes by lessening the impact of factors that hinder the realization of integrative outcomes, which are more likely to occur when the parties are able to identify differences regarding their priorities, resources, risk preferences, and utilities (Pruitt 1981). Trading on these differences represents a rich source of value to be mined in a negotiation (Raiffa 1982, p. 131; Lax and Sebenius 1986). However, it is difficult to identify and optimally trade on these differences because (1) parties are not clear about their own priorities, (2) optimal trades are sometimes "lost" in the complex communication pattern that characterizes a negotiation with many issues, (3) most negotiation situations present the potential for strategic behavior and parties sometimes mislead others regarding their preferences and priorities, (4) human emotions often interfere with rational judgment, and (5) a bias toward "fair" solutions sometimes leads negotiators to exhibit what we call "compromise bias," i.e., parties prefer to find some compromise position between the parties' initial demands on each separate issue rather than to explore tradeoffs between issues that might yield them higher individual and joint gains. This is similar to the notion of the fixed-pie bias referred to by Neale and Bazerman (1991, p. 63).

NA's design addresses these barriers to integrative bargaining in the following ways. First, through the use of several utility assessment techniques, the system helps the parties disaggregate their own preferences and priorities in order to better understand them. Preference assessment is based on a combination of simple additive utility functions recommended by Keeney and Raiffa (1991), and conjoint analysis techniques that have found wide application in psychology and marketing research (Green and Srinivasan 1978, Green and Krieger 1993). These procedures enable users to develop a more precise gradation of their preferences by assessing issues both "one at a time" and as "part of a package." At every stage of utility assessment, users are given maximum flexibility to

internalize insights that are gained as a result of reflection on the bargaining set. By disaggregating preferences, we expect that the parties are more likely to identify and trade on differences between their priorities (Keeney and Raiffa 1991). Second, the system uses a depersonalized computer network environment through which parties negotiate, thus separating "people" from the "problem." The system also provides both parties with real-time, subjective evaluations of the value of offers and counteroffers as they are made. These aspects engender a problem-solving orientation that make salient the rational settlement points (Pruitt 1981).

Finally, by providing a postsettlement option, the system helps parties identify Pareto-superior settlements, where at least one party is strictly better off, and neither party is worse off. In this way, NA provides a technique for minimizing value left on the table after the parties have reached a settlement (Raiffa 1985).

Maximize Confidentiality and Minimize Potential for Gaming the System. Another important design objective of NA is to maximally protect the confidentiality of each side's subjective preferences until such time as both sides have agreed to a deal and both sides agree to examine options that may improve the deal they have concluded. At no time are the inputs of one party revealed to the other except as that party may choose voluntarily to share such information with her counterpart, just as she might in a conventional interaction.

Operation

NA utilizes a multistage process that enables negotiators to prepare for, execute, and evaluate negotiated solutions over a computer network. The inputs provided by users in the preparation stages may be edited and revised as often as needed as negotiations progress. The system provides three main functions: preparation for negotiation, structured communication, and postsettlement evaluation. To illustrate the operation of the system and the user interface, we provide a few sample screens from the system in Figure 1.4

Stage I of NA, called "Issues," specifies the domain of the negotiation, including the issues in play and the options that may be considered for each issue (Screen 1, Figure 1). Following Keeney and Raiffa (1991, p. 132), the current version of the system employs the restrictive assumption that "all inventing and creating of issues has occurred," and that the parties are ready to negotiate over the identified issues. While this is a significant limitation to the practical application of our system, it does, however, allow us to more precisely test the potential value of the system to enhance integrative bargaining.

In Stage II, called "Prepare," NA uses an additive "self-explicated" scoring model to elicit information regarding (1) the relative preferences among issues, and (2) the relative preferences among the options for each issue. The users are first requested to distribute 100 points across all the issues; the users then indicate how many of the points available for each issue they would award themselves for obtaining each option within that issue. NA requires that the most preferred option for an issue be assigned all the points associated with that issue and the least preferred option be assigned zero, and other options awarded some number of points between these two extremes (with ties getting equal numbers of points).5

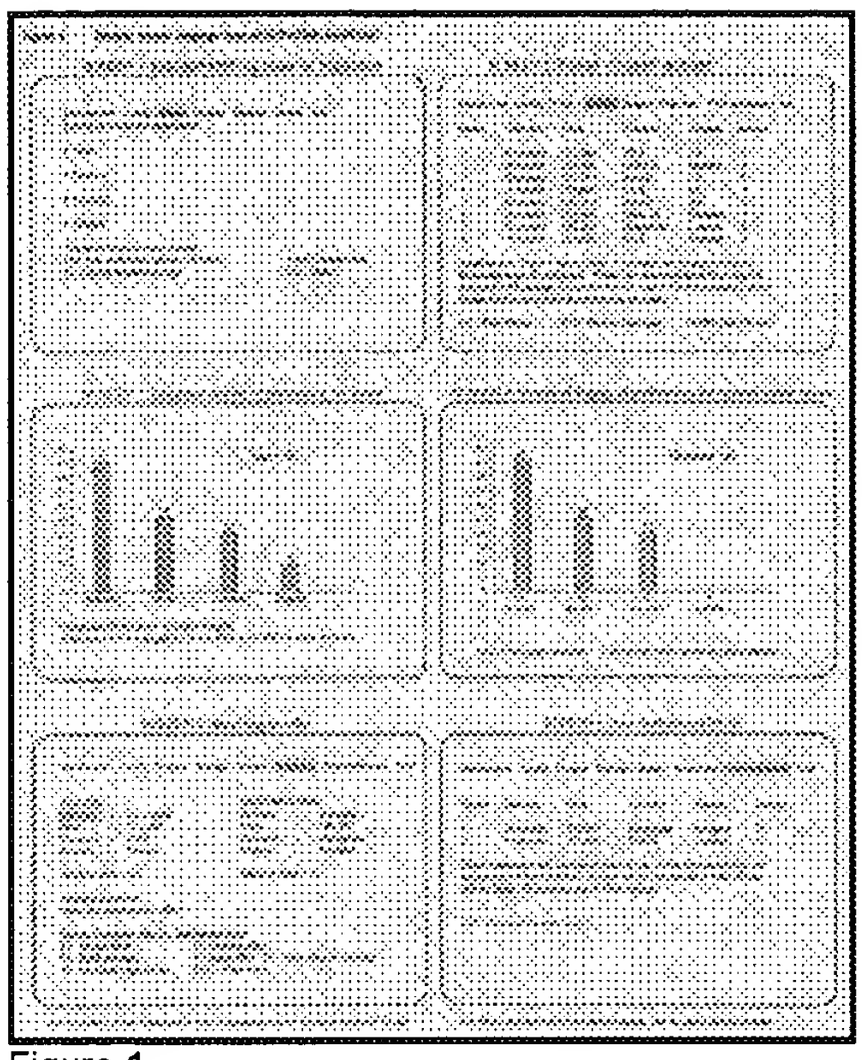
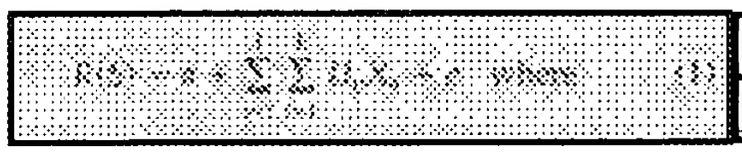


Figure 1.

Using the scores from Stage II, NA constructs in Stage III, called "Ratings," a set of sample settlement packages that includes one option from every issue in play (Screen 2, Figure 1). The ratings task gives the user the opportunity to contemplate options in the context of an overall agreement covering all issues simultaneously. The set of packages is selected automatically using conjoint design to form an orthogonal array. The use of an orthogonal array enables the computation of utilities for each issue and for each option within each issue independently of other issues and options.6 The selected set of packages is arranged in descending order of preference based on the scores provided in Stage II, but the scores themselves are not displayed to give users a fresh look at the consequences of their prioritization in Stage II.7 The user is then asked to rate each package on a scale . from 0 to 100 to indicate the value that package would have if it were to become the final settlement.

Conjoint design is used in selecting all but a maximum of two of the packages to be rated. These two packages frame the conjoint set. The top package is one that yields the highest Stage II score for the user (i.e., it gives the user his or her most preferred options on each of the issues) and is rated at 100 points. The bottom package is one that yields the lowest score (i.e., it gives the user his or her least preferred options on each of the issues) and is rated at 0 points. Between these two extremes are displayed the orthogonal packages, which may be rated at any value the user desires. In essence, in completing the ratings task, the user confronts many of the tradeoffs implicit in the negotiation.



Enlarge 200%

Enlarge 400%

When the ratings stage is completed, the utility weights, u^subij^, for the ith issue and the jth option of that issue are computed automatically using the following dummy variable regression model (the number of packages presented to the user is chosen to provide sufficient degrees of freedom to estimate the coefficients of the model):

S : A particular settlement presented to the user for her rating;

a: Constant term in the regression model;

R(S): The rating score for S given by the user (on a scale of 0 to 100);

U^subij^: Utility associated with the jth option (j = 1, 2, 3, . . ., J^subi^) of the ith issue;

I: Number of issues;

J^subi^: Number of options of issue i;

X^subij^: Dummy variable with X^subij^ = 1 if the jth option of the ith issue is present in settlement package S, 0 otherwise;

e : Error term, under the usual assumptions of the linear model.

Once u^subij^'s are computed, this information can be accessed graphically from Stage IV, called "Graphs" (Screens 3 and 4, Figure 1). The utility function is presented in the form of bar graphs showing the relative weights of each issue and, within issues, of each option (rounded to the nearest integer). The graphs are also scaled between 0 and 100. In essence, users now observe graphically how their issue-by-issue and option-by-option priorities are affected by the exercise of trading these items off against one another in proposed settlement packages. It is not uncommon for users to feel somewhat dissatisfied with the values reflected in the graphs, and NA permits users to manipulate the graph bars directly using cursor keys to further refine their preferences.

Stage V, called "Negotiate," takes place after the computer has received Stage IV graphic inputs from both parties to the transaction. In essence, the system provides an electronic bargaining table on which negotiations take place. Offers, counteroffers, and written messages can be sent and received over the network. All offers are binding and cannot be retracted, but messages can be exploratory.8 Explicit offers (displayed on the left side of the screen) and counteroffers (displayed on the right side of the screen) are both scored for the user utilizing the party's private preference scores for options generated in Stage IV (Screen 5, Figure 1). Bargaining proceeds in this fashion until either an impasse or an agreement is reached. If no agreement is reached, the parties simply terminate the negotiation, just as they would in a conventional encounter. Mindful of the potential for strategic behavior if an impasse were to trigger release of information in the form of suggestions for continued bargaining, NA does not prompt the parties to continue, nor does it reveal anything about the parties' preferences.

If the parties succeed in reaching an agreement, they enter Stage VI, called "Postsettlement" (Screen 6, Figure 1). This feature follows the suggestion of Raiffa (1985) regarding the possible value of "postsettlement settlements" in which a third party might help negotiators make Pareto-improving moves following an agreement. In Stage VI, NA acts as a computermediator. The system examines the final agreement and compares this package with all other possible packages in the negotiation set. It then generates a list of packages that are, based on the Stage IV inputs of both parties, more advantageous than the current settlement package for one or both sides without making either side worse off.9 (These Pareto-superior packages are calculated in the computer's internal memory, and are not stored anywhere. Once the negotiation ends, this information simply disappears.) If both parties agree, the Pareto-superior packages are revealed to the negotiators in order of their respective desirability to each party. Once again, if both parties agree, they may continue the negotiations in hopes of reaching an agreement on one of the packages suggested by NA. If no such agreement can be reached, the parties revert to their original "Pareto-inferior" deal.

Stage VI can be repeated as often as NA is able to identify at least one package that makes one party better off without making the other party worse off. When a final deal has been struck, either with or without the help of the "Postsettlement" stage, the parties are congratulated on reaching an agreement and they can then exit the system. NA then creates and stores files recording their inputs, negotiation exchanges, and postsettlements.10

4. Experiment and Results

Hypotheses

To test the efficacy of the NA system, we designed a laboratory experiment using a simulated two-party, multiissue sales negotiation. In designing our experiment, we sought to answer two overriding questions: (1) Would parties using NA achieve a higher proportion of efficient agreements as compared to negotiators using conventional face-to-face negotiations, or using an e-mail messaging system? 2) How do the three basic functions of NA, namely, preparation using utility assessment, structured communication, and postsettlement facilitation, contribute to its overall impact on negotiation outcomes? More specifically, we hypothesized that parties using NA would make more integrative trades as compared to parties not using NA, and we hypothesized that each function of NA would add incremental value by building on the part that precedes it. Thus, we propose the following formal hypotheses (see also Lim and Benbasat 1993):

HYPOTHESIS 1. Computer-based utility assessment prior to negotiation leads to more Pareto-efficient outcomes (i.e., subjects using NA for preparation (NAP) will make more integrative trades as compared to subjects who negotiate face to face or over an e-mail system).

HYPOTHESIS 2. The mere use of computers, without support for negotiation preparation and structured communication, will not lead to more efficient outcomes (i.e., subjects using e-mail for negotiation will achieve fewer integrative trades than those using NA).

HYPOTHESIS 3. Structured communication and postsettlement evaluation enhances achievement of Pareto-efficient outcomes (i.e., subjects using NA only for preparation will achieve fewer integrative trades than subjects who use all functions of NA).

HYPOTHESIS 4. The postsettlement option in NA will provide Pareto-improvements to agreements reached using only the preparation and structured communication features of NA.

The Negotiation Scenario

In the scenario presented for the negotiation, the subjects were instructed to act as agents for their respective companies. The information specified that, after a preliminary round of discussions, four issues remained to be resolved between the parties for the transaction to go through: price, delivery date, type of currency to be used, and forum for dispute resolution should contractual disputes arise. A range of options was stipulated for each issue, and the buyers' and sellers' separate instructions revealed the relative importance of each issue and option to them. Table 1 summarizes the induced preference structures for the two roles.11 Due to a shortage of hard currency, the Hungarian buyer for East Europa Medical Group gave the highest priority to the type of currency to be used and preferred Hungarian currency to all other options. In contrast, currency was the U.S. seller's (Healthcare, Inc.) least important issue. The U.S. party valued a delayed delivery date of 14 months over all other items because of a shortage of inventory. The Hungarian buyer, on the other hand, rated delivery as third in importance, just above its fourth-rated dispute resolution issue. Both parties rated price second in priority and both could close a transaction at any of the four price options listed in their instructions. The U.S. seller valued the dispute resolution forum third, just above the least important currency issue. There was thus a clear, mutually advantageous tradeoff to be made between the parties if the buyer obtained Hungarian currency (the buyer's first choice on its highest ranked priority-and the seller's least important issue) in exchange for an agreement to delay delivery to 14 months (the seller's first choice on its highest ranked priority-and the buyer's third ranked issue), assuming some acceptable agreement could be achieved on the issues of price and dispute forum.

Experimental Setup

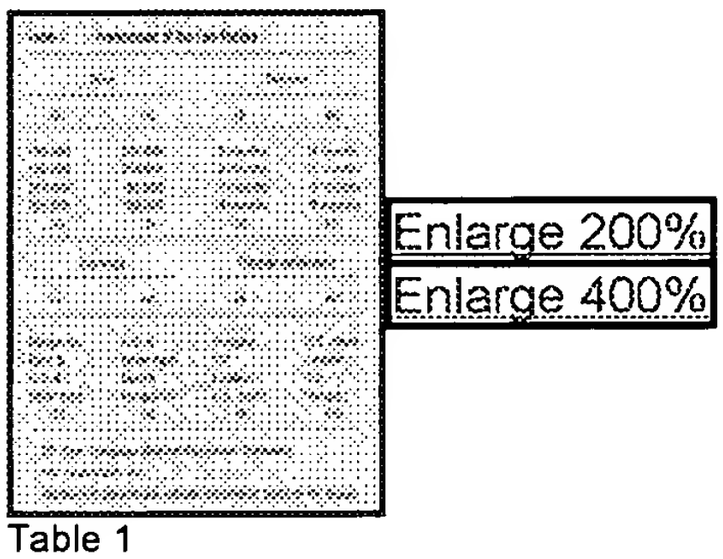


Table 1

First-year MBA students at the Wharton School of the University of Pennsylvania were recruited to participate in this study during their orientation week. Groups of MBA students were randomly assigned to one of four negotiation conditions: (1) face-to-face (FF), (2) e-mail messaging system (EML),12 (3) NA system used for preparation, but followed by a face-to-face negotiation (NAP), and (4) NA system used for both preparation and for structured communication (NAA). Two hundred seventy students participated in our experiment.13 We used a simple one-way research design to obtain an overall assessment of the NA system. While this design reduces the total resources required for testing the hypotheses, we acknowledge its limitations in precisely teasing out the effects of each component of NA. For example, the differences between NAA and NAP include the effects of both computer-mediated communication and computer-supported postsettlement analysis. In each experimental

condition, subjects were randomly assigned to the roles of buyer and seller.

In the face-to-face condition, subjects met in pairs in supervised classrooms, were given the negotiation simulation to study, and were then permitted to freely negotiate with each other for as long as it took them to reach an agreement. The pairs preparing and/or negotiating over the computer network met in supervised computer laboratories, were given both the scenario and the appropriate instructions on the use of NA or the email systems. Those negotiating over the network were not allowed to speak with each other face to face. Those in the NAP condition first prepared for the negotiation without knowing who their partner would be. After their preparation was complete, they were introduced to their partner for the face-to-face encounter. No time restrictions were placed on subjects in any experimental condition with respect to either preparation or negotiation.

To give the subjects a tangible incentive to bargain toward the goals stated in their respective role instructions, subjects were further informed that nondivisible individual prizes worth at least $100 would be awarded to the buyer and seller in each experimental condition who best fulfilled their respective management's priorities.l4 After reviewing and studying the case (and, for those in the NAP and NAA groups, preparing to negotiate using Stages I, II, and III of NA), but before actually negotiating, we asked all subjects to answer several questions, including the time they spent preparing for the negotiation and their "realistic" expectations about what a final agreement would look like. The subjects filled out a second questionnaire when they concluded the negotiation indicating the terms of their final agreement, their perceptions regarding the negotiation process, their affirmation that they bargained in good faith and did not collude to split the prize and, for those in NAP, NAA, or EML conditions, their perceptions regarding the system. The questionnaires used in the study were designed not only to provide us data for testing the formal hypotheses, but to also provide other information to help us characterize the subjects' overall experiences under the different negotiation conditions.15 Results

Prenegotiation Results. As expected, there were few significant initial differences between the groups in the four experimental conditions, except for a slightly higher average age in the FF condition (Table 2). The FF group consisted of entering MBA students in an earlier year. All groups reported occasional participation in actual negotiations over the past year, and two-thirds of the subjects in each condition were male, reflecting the gender composition of MBA programs.

A more important difference between the groups is that subjects using NA spent more than twice the time in preparing for the negotiation than subjects in the FF and EML groups. This difference between the groups is attributable to the fact that groups using NA had to master the operation of the system prior to negotiating. This required them to read through a 12-page manual, and to go through the system's prenegotiation Stages I, II, and III outlined in the previous section. Further, those in the NAP condition also had to print out the graphs of their preferences to take with them to the subsequent face-to-face negotiation. While this difference in preparation time could arguably explain some of our results, it is important to remember that increased preparation time is a direct consequence of a variable being manipulated in this study, namely, the use of the NA system to prepare for the negotiation.

Prenegotiation Aspirations. Subjects using NA had somewhat more integrative "a priori realistic expectations" regarding their priorities. For example, a higher proportion of subjects expect Hungarian currency and 14 month delivery than subjects in the EML and FF conditions. These differences between the groups are intriguing and, we believe, reflect the subjects' use of NA's preparation stages to better understand and internalize their own preferences. The buyers in the NA groups had a higher expectation of Hungarian currency at settlement (19 out of 62 buyers versus 13 out of 64 buyers in FF and EML conditions combined), and sellers had a higher expectation of 14 months delivery at settlement (30 out of 63 sellers versus 19 out of 62 in the FF and EML conditions combined). These results suggest that people who understand their bargaining positions more clearly may be more likely to form expectations that they can achieve their higher priorities and positions. In the concluding part of this section, we explore the extent to which these aspirations influence the outcomes observed in the negotiations.

Postnegotiation Results. There were several significant differences in outcomes achieved by the four groups. Most importantly, parties using NA for preparation (i.e., those in the NAP condition) executed a higher number of integrative trades than those who did not use NA, providing strong support for H1. For example, Table 3 highlights the most frequent settlements for the issues "Currency" and "Delivery." Recall that our scenario embedded an integrative tradeoff between these two issues that called for the seller to achieve a 14 month delivery term and the buyer to achieve Hungarian currency. Twelve of the 34 pairs in NAP achieved this integrative settlement, suggesting capitulation by both sides on lower rated issues in order to obtain the best options on their highest rated issue. Only 4 of 34 pairs in FF, and 4 of 33 pairs in the EML conditions made this trade. To assess the statistical validity of these differences in outcomes, we conducted a Pearson X^sup2^ test of independence. That is, we

tested the null hypothesis that outcomes reached under FF, EML, and the NAP are independent of the negotiation condition." This is rejected at a significance level less than 0.023 (X^sup2^(3) = 9.58). (For conducting this test, we combined the results of FF and EML conditions because outcomes under these two conditions are not significantly different from each other (X^sup3^(3) = 1.54).)

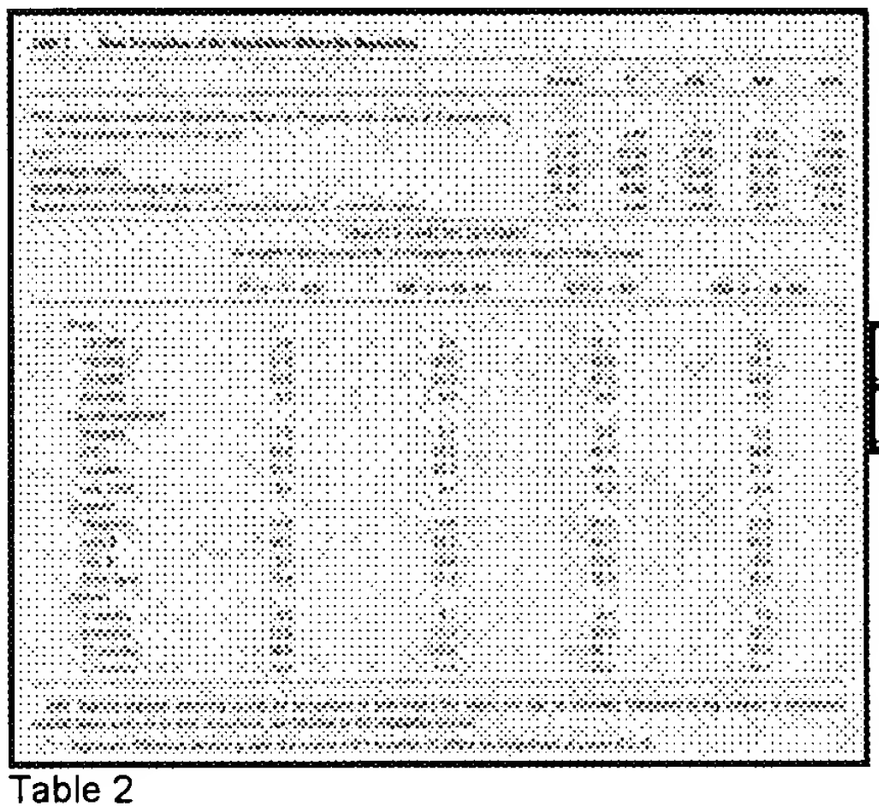


Table 2

The EML outcomes are inferior to the outcomes from the NAA condition at a significance level less than 0.009 (x^sup2^(3) = 11.57), providing strong support for H2. An interesting outcome in the EML condition is that three pairs did not reach any agreement, when in fact the scenario included only options that provided gains from trade for both parties. This, combined with the inability of two pairs in the NAA condition to reach an agreement, suggests that computer-based communication leads to very poor outcomes for some parties who are not able to effectively handle an impersonal mode of communication, and behave in a more noncooperative manner (Wichman 1970; Arunachalam and Dilla 1995). Thus, the use of systems such as NA may in fact make disagreement outcomes more likely to occur in negotiation contexts with little integrative potential. This raises interesting research issues for further evaluation of NSS.

Although outcomes in the NAA condition (after postsettlement) appear to be more integrative than outcomes in the NAP condition (17 versus 12 out of 34 pairs settling on Hungarian-14 months), the overall differences in outcomes are not statistically significant given our small samples. However, by partitioning the chi-square value to test for independence between components (Agresti 1990, p. 50), there is a marginally significant difference ($p < 0.065$) between NAP and NAA with regard to achieving Hungarian-14 month versus Hungarian-12 month outcomes (X^sup2^(1) = 3.41). It is also important to note that the number of incremental dyads (5) that reached integrative trades in NAA is more than the entire set of dyads that reached integrative agreements in the FF or the EML conditions (4 each).

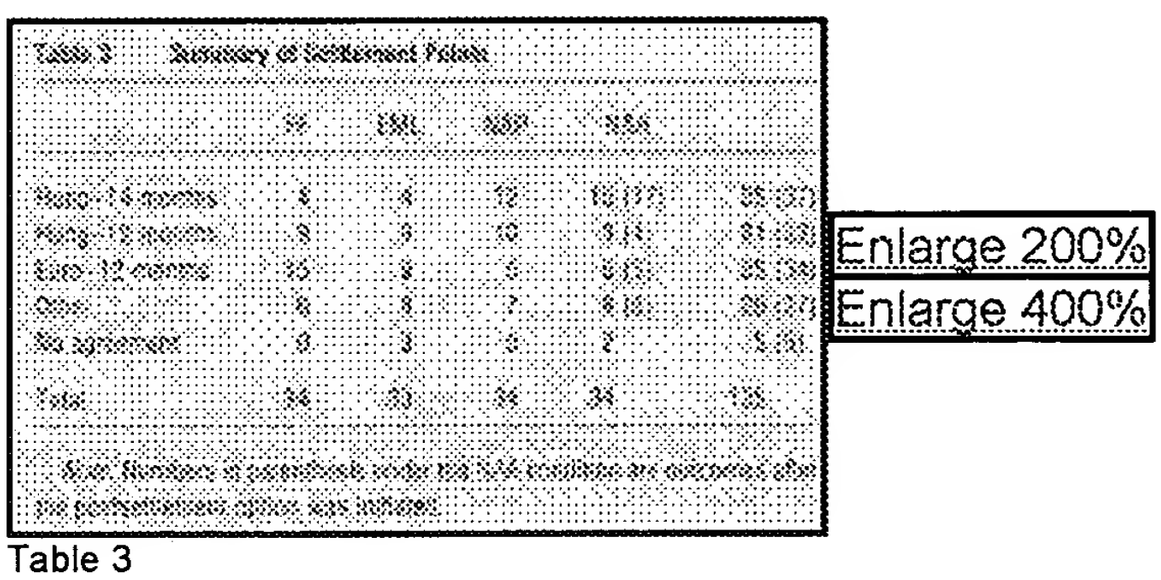


Table 3

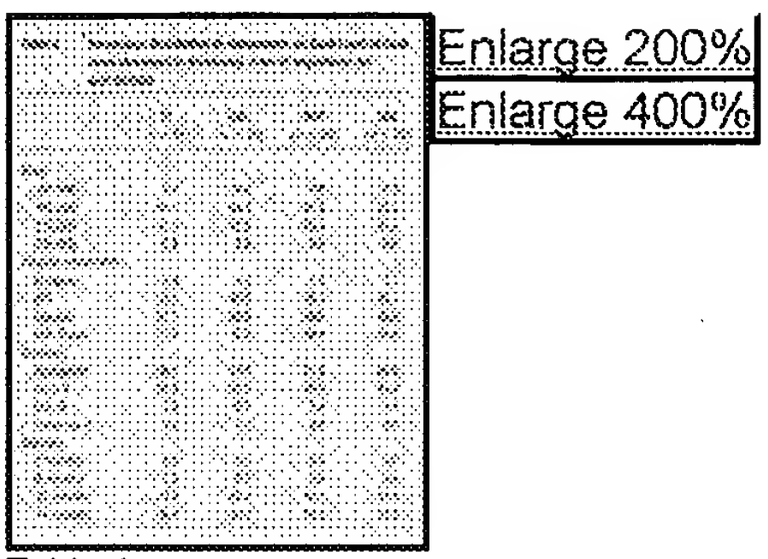


Table 4

To analyze the outcomes between the NAP and NAA conditions more fully, we will examine the preference structure of the two parties summarized in Table 1, and the distribution of outcomes on each option of each issue, as summarized in Table 4. From Table 1, we see that integrative solutions are characterized by East Europa giving up on delivery (third important issue for EE and most important issue for HC) to gain on currency (most important issue for EE, but least important issue for HC). In addition to this "major trade," there is a "minor trade" that enhances the efficiency of outcomes. The parties could trade on Dispute (least important for EE, but third most important for HC), where EE can give up on Dispute options in exchange for concessions from HC on other issues (e.g., price). This suggests that in efficient settlements, we should see Dispute settlements more favorable to HC (more London and U.S. courts). The outcomes in the NAA and NAP conditions seem to support this in a directional sense. Thus NA's structured communication process and postsettlement support provide only secondary benefits compared with the value added by NA's preparation function. However, as the efficiency of relatively minor trades become more important (e.g., when the number of issues increase), these secondary benefits could become very significant. In summary, we found only directional support for H3, a surprise given our expectations for the impact of electronic bargaining tables.

Hypothesis 4 was not supported. Eighteen of the 32 pairs reaching an agreement in the NAA condition settled on a final agreement without utilizing the "postsettlement" feature (i.e., their agreement was already Pareto-efficient given their inputs). The remaining 14 pairs accessed the postsettlement feature and examined packages that were Pareto-superior to their initial settlement, based on their prenegotiation inputs. Of these 14 pairs, only 6 chose to reinitiate the negotiation, and 5 of these pairs reached a settlement different from the one they had initially agreed to. Of these 5 pairs, 3 pairs moved from their initial settlement to a Pareto-superior one that incorporated the tradeoff between Hungarian currency and a 14-month delivery term. Thus, the postsettlement feature did prompt some parties to examine and capture additional joint gains from the negotiation, but more than half of those who accessed the postsettlement feature did not utilize it. Subjects' responses to open-ended questions and debriefings suggest several possible explanations for this result. First, some subjects reported that reopening the negotiation after reaching an agreement revived uncomfortable, distributive aspects of the bargaining that they preferred not to reexperience. Second, some subjects experienced subtle changes in preferences as a result of interactions that took place during the negotiation. Their postsettlement preferences thus diverged both from those stated in the scenario and from their own prenegotiation scoring inputs, rendering the suggested postsettlement options unattractive. Finally, in combination with the factors listed above, subjects simply found the postsettlement feature awkward to use as designed. These results suggest that we should rethink the design of the postsettlement feature for NA.

Aspiration Levels and Postnegotiation Outcomes. To explore how NA influences outcomes, it is instructive to first select for analysis dyads in which either the buyer aspired for Hungarian currency or the seller aspired for 14-month delivery. Of 30 such dyads (out of a total of 67) in the combined FF and EML conditions, only 2 dyads achieved the integrative trade with Hungarian-14 month outcome, while 13 achieved the next best outcome, namely, Hungarian12 months. In contrast, in the NAP condition, there were 19 dyads (out of a total of 34) with at least one party having high aspirations and 9 of them achieved the integrative trade, and a further 5 dyads achieved the Hungarian-12 month outcome. Of further interest is that in the NAA condition, there were 20 dyads (out of a total of 34) with high aspirations, and 14 achieved the integrative trade, while 1 dyad achieved the second best Hungarian-12 month outcome. These results, in conjunction with the overall outcomes summarized in Table 3, suggest that when the parties have high aspirations, integrative trades are more likely to occur, and this likelihood is enhanced greatly by the use of the NA system. Earlier, we noted that the preparation function of NA also helps establish higher aspirations prior to negotiation.

Table 5 summarizes some of the postexperiment perceptions of the negotiators in the four groups. Those using NA

appear to have communicated more honestly and felt that the settlement was more favorable to their interests than those in the other groups.

5. Discussion and Conclusions

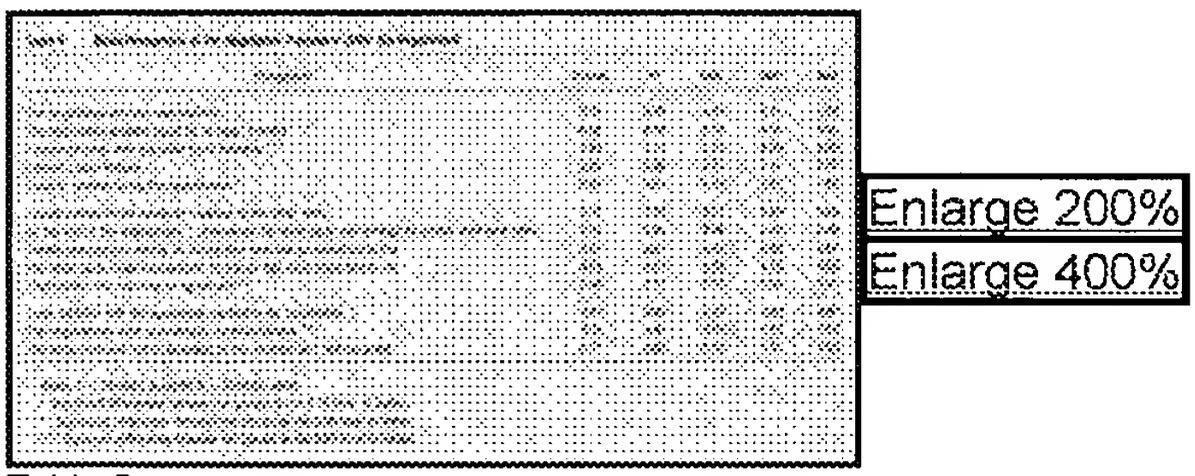


Table 5

The experimental test provides support for the hypothesis that the use of the NA system developed from our research is likely to help negotiators achieve Paretosuperior outcomes in structured multiissue negotiations. The fact that negotiators using NA made more integrative trades than those who negotiated face to face or using an e-mail system suggests that NA system played a key role in helping parties overcome some of the barriers to integrative bargaining that afflict conventional negotiations. The equivalence in outcomes (in terms of integrative trades) between subjects using the e-mail system and those negotiating face to face suggests that the mere use of computer technology will not improve negotiation outcomes. The key to achieving integrative trades is to set and maintain high aspirations in conjunction with a problem-solving orientation (Pruitt and Lewis 1977, p. 181). High expectations provide the motivation to keep looking for integrative trades without settling on compromise solutions, while the problem-solving orientation provides the approach for identifying alternative proposals to offer to the other party that still maintain high potential benefit for self. Thus, the value of NA derives from helping negotiators prepare for the negotiation, and this value is preserved and enhanced if computer communication is structured to make the preparation inputs salient during the negotiation.

Our results demonstrate that NA serves as a useful operational mechanism to implement negotiation analysis to facilitate integrative negotiations. These results, however, do not suggest that NA offers a uniquely superior computer system to prepare or conduct negotiations. Other systems that incorporate utility assessment procedures and/or structure the communications between the parties might also do as well as NA.

Based on our results, we feel comfortable recommending that NA be used for preparation, preferably by all parties to a negotiation. However, we question our initial vision that refined versions of our electronic bargaining table could be deployed across computer networks. First, the subjects in our test began with a fully specified set of issues and options. In fact, in conjoint analysis, a basic assumption is that all options of every issue are in the acceptable range (Srinivasan and Wyner 1989). Most real-world negotiations are not so well structured. To remedy this shortcoming, the system would have to be expanded to include an agendasetting stage prior to the current "issues" stage. This raises additional concerns. An agenda-setting stage could introduce strategic behavior on the part of the negotiators that might subvert the use of our formal model. This requires further investigation.

A second, more general limitation of the tested version of the NA involves its utility assessment procedures, and thus, applies both to the preparation feature and to the electronic bargaining table. The methods of multiattribute utility analysis do not easily model the various interactions among issues that sometimes exist in complex bargaining situations. For example, some interactions significantly alter the value of an issue under special, specified assumptions, thus requiring the system to present models that list the issue as having a very high value under one set of assumptions and a much lower value under others. Such problems are imbedded in the use of multiattribute utility analysis and are subject to solutions as negotiation analysis develops improved models for representing preference interactions.

A third limitation of the system, discussed with respect to H4, involves the postsettlement stage. As now configured, this stage may leave the parties vulnerable to pure distributional bargaining between Paretosuperior packages, especially if there are only a few such packages. This could injure a relationship that, prior to the postsettlement stage, was in good working order. One solution to this problem is to simply ask the parties, prior to the beginning of the negotiation, to agree to an objective criterion for selecting an optimal postsettlement. The negotiators may be asked to choose from a set of criteria such as those suggested by Keeney and Raiffa (1991). The efficacy of

alternative methods of postsettlement support have to be evaluated in future research, especially in view of the possibility of the users gaming the system. An interesting variation on our experiment to test H4 would be to ask subjects who negotiate entirely on a face-to-face basis, to use NA after they reach an agreement to see whether the postsettlement feature improves outcomes.

These limitations of NA are significant. For the moment, however, the value of the system has been demonstrated in our experimental setting, and in our classrooms, where we use it to teach students in a tangible way the structure of integrative tradeoffs and the value of analytical approaches to facilitate negotiations. The system has been used successfully for several years at a few leading MBA programs to demonstrate the principles of utility assessment, integrative tradeoffs, Pareto-optimality, and other concepts of negotiation analysis.

NA also presents new research opportunities. For example, it might be used to help investigate paths toward integrative settlements. Mumpower (1991) has provided some initial insights into preference structures which facilitate "horse-trading." Because the system can keep track of the history of offers, counteroffers, and messages, this allows for investigating patterns that lead to integrative bargaining solutions. Another opportunity for future research is the comparative testing of the NA process against competing processes such as those used in ICANS, or even simple training programs focusing on integrative bargaining, to isolate the relative merits of each of these approaches in situations where all of them can be deployed."

[Footnote]
1 We use the terms negotiation and bargaining interchangeably.

[Footnote]
2 An efficient agreement may be conceptualized in terms of the framework of cooperative game theory, as proposed by Nash (1950). The Nash model reckons payoffs from potential settlements of a negotiation in terms of the utilities of each potential settlement to each party. If mixed strategies (random strategies) are allowed, then the Nash model proposes a normative settlement, called the Nash bargaining solution, that satisfies several appealing criteria including Pareto efficiency. However, the Nash model falls short as a description of real negotiations. In particular, the use of mixed strategies is rarely observed in negotiations, possibly because the performance of a realworld negotiator is evaluated in terms of the utility associated with

[Footnote]
the actual settlement realized, rather than on the strategic desirability of a mixed strategy (Luce and Raiffa 1957). Real-world negotiations are often conducted using pure strategies, i.e., in issue space rather than in utility space. If the negotiation involves only one issue, then the settlement reached using pure strategies will generally be Pareto efficient, but this need not be the case when the negotiation involves multiple issues.

[Footnote]
3 DECISION CONFERENCING is a prototype GDSS that can be applied in a negotiation context (Rao and Jarvenpaa 1991). The negotiating parties first separately develop a decision model with the help of a third party facilitator using decision-analytic techniques. After this, however, the parties communicate directly in identifying a mutually preferred settlement relying on "democratic protocols" and by using various techniques such as decision trees, expected utility maximization, and Pareto algorithms.

[Footnote]
4 Interested readers may obtain a more detailed illustration of the operation of the system by writing to the authors. 5 This assures that the worst outcome in the negotiation (equivalent to the Best Alternative to a Negotiated Agreement (BATNA)) has a value equal to 0, and the best outcome has a value equal to 100. Note also that the "constant sum" scale used here has interval-level properties. 6 An orthogonal array of packages yields several additional benefits. First, orthogonality minimizes the number of packages to be evaluated by users, while still giving a good picture of the user's preferences. For example, if there are four issues each with four options each, there are a total of 256 possible settlement packages. An orthogonal design here could consist of as few as 16 packages. Second, it provides an "additive" utility model enabling the system to derive the imputed value of any package discussed during the negotiation, including, in particular, those not presented in the sample set of packages rated by the users.
The conjoint analysis feature is a significant departure from multiattribute preference elicitation procedures (where used) in previous NSS systems. ICANS and MEDIATOR use formal mechanisms for preference elicitation. However, the packages presented by these systems are not orthogonal, and hence, the resulting utility measurements do not necessarily provide a reliable additive model of preferences. If the set of packages departs considerably from orthogonality, the parameters of the estimated additive utility functions can be unstable, and not valuable for the purposes of identifying efficient settlements. 7 The Prepare stage is technically referred to as the self-explicated, or the "compositional" method of preference elicitation (Srinivasan and Wyner 1989, Green and Krieger 1993). In contrast, conjoint analysis is a "decompositional technique" in which overall preference scores are decomposed into the utility values attached to each issue and options within issues. In early trials of the system, we only had the "Ratings" stage where the profiles were presented in random order. However, the respondents found this task to be very difficult because of their inability to find ap

propriate anchors to facilitate the rating process. It is in view of this that we added the "Prepare" stage as a way to facilitate the Ratings stage.

[Footnot]
8 In electronic markets, intermediaries are emerging to ensure the security and integrity of the system, and enforce all the rules agreed to by parties.

[Footnote]
9 The Pareto-superior packages displayed to the users are automatically scored according to their own preference functions. However, the revelation of these packages only provides ordinal information about the other party's preferences, i.e., it reveals whether a settlement is equal to or superior to the agreed settlement without disclosing the degree of superiority. An alternative display format would indicate only that Pareto-superior packages exist without disclosing the packages themselves. This is the approach adopted in the design of the ONDINE II system (Nyhart and Samarasan 1989). Additional criteria such as "equitability" of each superior package may be used to trim the number of packages displayed.
10 This information is only stored in the local computer of the user. The users may choose not to record any of the exchanges, by selecting the appropriate option in the "Config" menu option.

[Footnote]
11 Only ordinal preferences were induced. The subjects internalized these preferences in their own idiosyncratic manner. This approach

[Footnote]
enabled us to minimize preference variability between subjects, while at the same time allowing subjects in the computer condition to use the preference assessment procedures to better understand their preferences. In real negotiations, subjects are not as clear about the priorities, and may benefit more by using the NA system to understand their preferences. Thus, the experimental procedure is likely to understate any realized benefits of the system.

[Footnote]
12 A Windows-based e-mail system was designed specifically for our experiment. In addition to allowing parties to send messages of unlimited size to each other, the system allowed the parties to conveniently review past messages sent and received. Because e-mail systems have become commonplace, we are not describing our system in any detail here in order to conserve space.
13 The experimental procedures involving the three computer conditions took place in August 1995, except for four dyads that were completed in September 1994. Subjects in the three computer conditions were randomly assigned to the treatments. The face-to-face negotiations took place in September 1993. At that time, the subjects were randomly assigned to either the FF condition or to the NAP condition. The results of that NAP condition are similar to those reported here, and were included in earlier versions of this paper. To conserve space, they are not reported here. Because the groups in the face-to-face condition negotiated at a different time than the groups in the computer conditions (but at the same school, and under similar conditions), there is a possibility that the experimental results are a function of the pretest differences in the subjects. However, the demographic profiles of our subjects were similar across all times and conditions (see Table 1). Further, the agreements reached in the face-to-face condition are consistent with literally hundreds of classroom simulations over four years using this same scenario for instructional purposes.

[Footnote]
14 To minimize chances of collusion in the face of this monetary incentive, we emphasized that the subjects would be required to sign a statement after completing the negotiation that they did not collude to obtain any part of the prize. In the context of the Wharton School's Code of Academic Integrity, we expect this signature to be a significant deterrent to bad faith conduct. In addition, as noted above, all negotiations took place in facilities where subjects were under observation throughout.

[Footnote]
15 A copy of the experimental materials may be obtained by writing to the authors. In the interest of space, we do not report the analyses we have done on the postnegotiation questionnaires.

[Footnote]
16 Note that not all respondents provided answers to this question. This accounts for the variations in sample size used for these statistics. 17 In conducting the following x2 tests, we collapse the no agreement outcomes under the "other" category, except when directly comparing outcomes of EML and NAA. This does not materially affect the results reported.

[Footnot]

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